AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

Entered as second-class matter at the postoffice, Dalton, Ga., under Act of March 3, 1879.

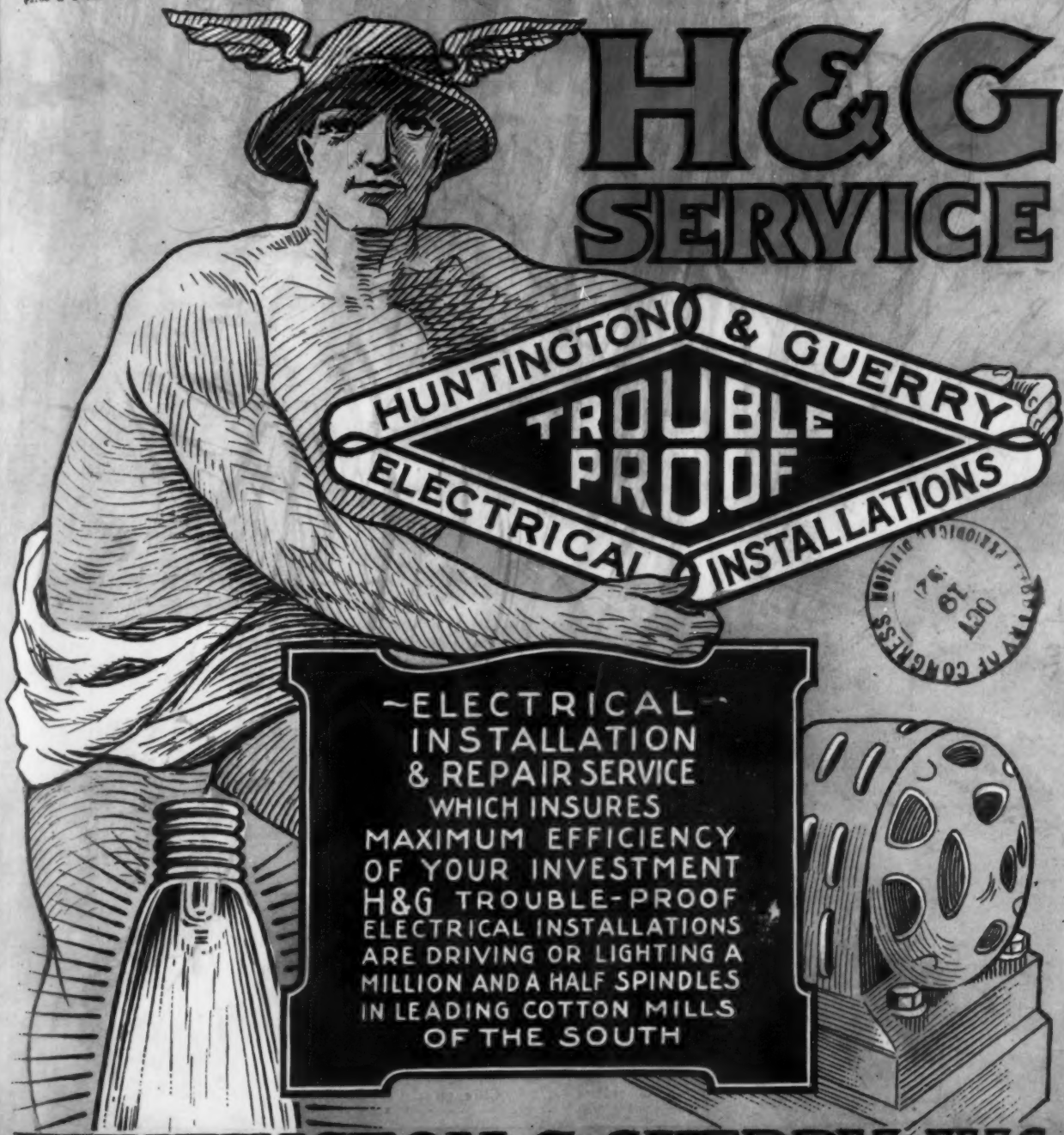
Volume 85
Number Twelve
$1.00 a Year.

OCTOBER, 1921

Published monthly by
W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

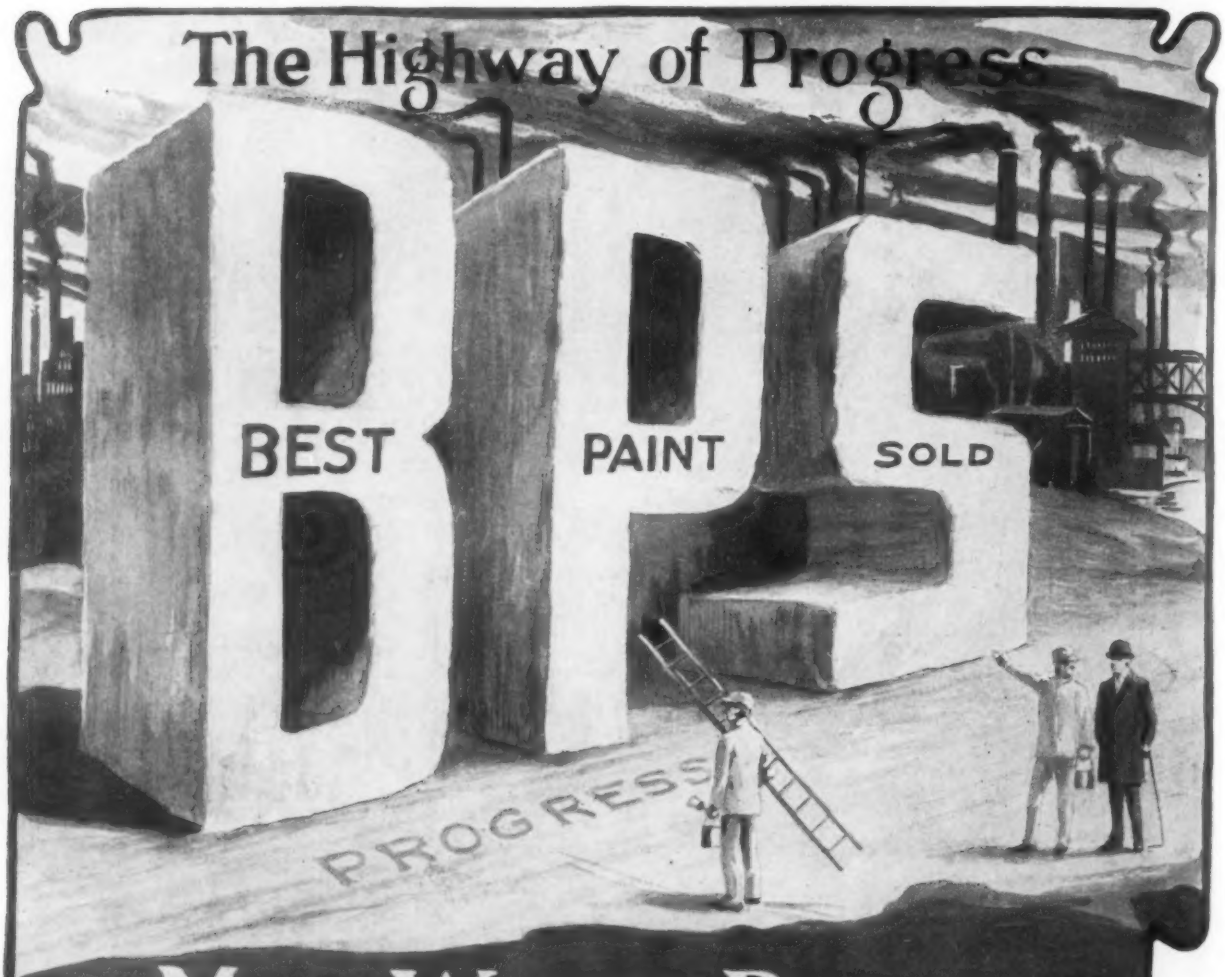
H&G SERVICE

HUNTINGTON & GUERRY
TROUBLE PROOF
ELECTRICAL INSTALLATIONS



-ELECTRICAL-
INSTALLATION
& REPAIR SERVICE
WHICH INSURES
MAXIMUM EFFICIENCY
OF YOUR INVESTMENT
H&G TROUBLE-PROOF
ELECTRICAL INSTALLATIONS
ARE DRIVING OR LIGHTING A
MILLION AND A HALF SPINDLES
IN LEADING COTTON MILLS
OF THE SOUTH

HUNTINGTON & GUERRY INC.
GREENVILLE, S.C.



MILL WHITE PAINT

For Progressive Mills

Mill White will not yellow, flake off, or collect dirt. It may be washed like tile and withstands the vibration of the heaviest machinery.

Three Finishes
Flat, Eggshell and Gloss

Can be brushed or sprayed.

Manufactured by

The Patterson-Sargent Company

New York Cleveland Chicago St. Paul Kansas City

HASTINGS' PATENT METAL BUSHED NORTHROP LOOM BOBBINS

TRADE-MARK REG U S PAT OFF

Reduce the annual expense for bobbins notwithstanding the added cost of the metal bushings.

We can furnish either feeler or cone bobbins for Northrop looms and with any desired outside shape and to fit centrifugal clutch or other standard spindle.

DRAPER CORPORATION

ATLANTA GEORGIA HOPEDALE MASSACHUSETTS

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1888~1921

AMERICAN
HUMIDIFYING
SYSTEMS

LIVING UP TO OUR REPUTATION

IN 1888 we manufactured our first humidifying systems. During succeeding years, we have turned out a vast number adapted to practically every industry where air-moistening devices are employed, throughout the United States and many foreign countries.

It has been our purpose never to experiment on the purchaser of one of our systems, but to conduct conclusive tests in our own factory with each type of apparatus before a single one is sold.

It is easy to understand then how we have established an unrivalled reputation for the efficiency of AMERICAN HUMIDIFYING SYSTEMS—**and this reputation is worth dollars and cents to purchasers.**

Added to our own efficient organization, we are pleased to announce the close cooperation of the GRINNELL CO., Inc., well-known manufacturers of automatic sprinkler systems, piping, valves, etc., who are recognized national authorities in this field.

The combined services of the engineering staffs of both organizations are at your disposal for consultation with regard either to the installation of new equipment or bringing old or antiquated systems up to the highest possible efficiency.

AMERICAN MOISTENING COMPANY

BOSTON, MASS. **ATLANTA, GA.**

Factory Representatives:

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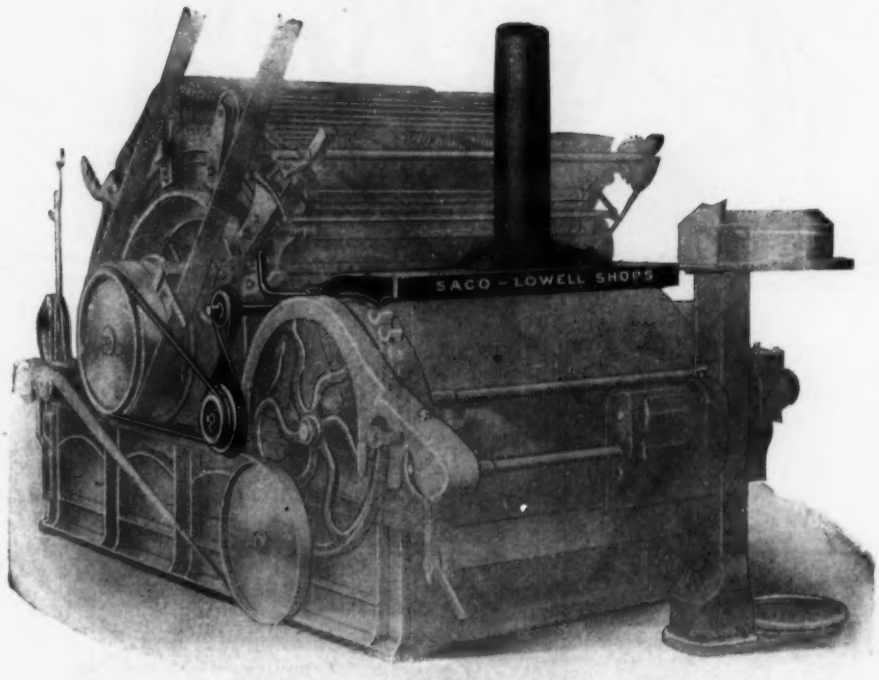
SACO-LOWELL SHOPS

TEXTILE MACHINERY



SACO-LOWELL CARD STRIPPER

WE BUILD A COMPLETE LINE OF COTTON MILL MACHINERY INCLUDING

OPENING	DRAWING	WINDING
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PICKING	SPINNING	WARPING
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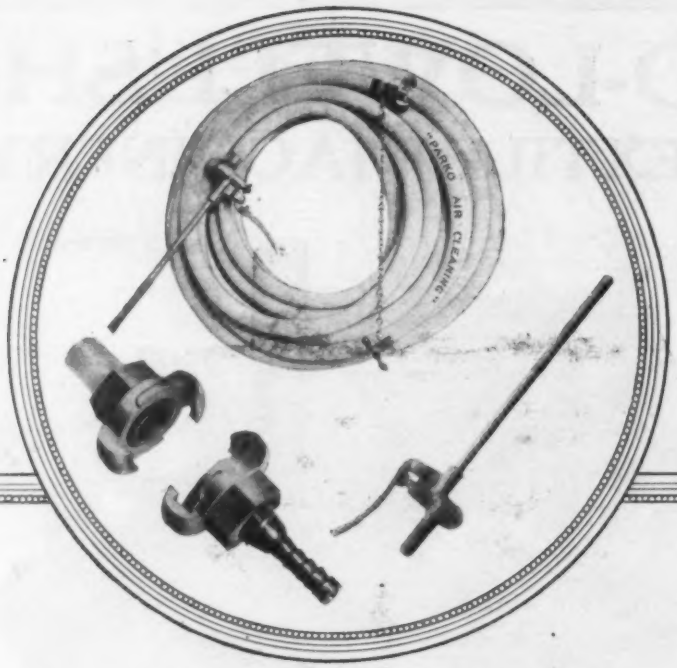

Hitch Your Air-Cleaning Problems to Real Air Cleaning Stuff

The Coupling:—The Parko Quick Hitch Coupling is not only easy to connect and disconnect. It is equipped with expanding gaskets which become tight as soon as the pressure is applied.

The Hose:—Practice has positively demonstrated the importance of using a light but durable hose. Parko hose is designed to strike a balance between weight and durability.

The Nozzle:—The small tip of the Parko nozzle limits the amount of air to that absolutely necessary to remove the lint. The long tip enables the operator to reach all parts of the machinery conveniently. The valve is self closing preventing waste of air.

Have you an air cleaning equipment?

Parks-Cramer Company

Engineers & Contractors
Industrial Piping and Air Conditioning

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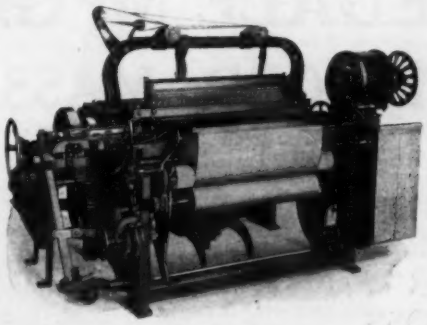
STAFFORD LOOMS

PERFECTION

THE attainment of perfection in the manufacture of their product is the goal of every responsible manufacturer.

New standards of perfection have been reached in the manufacture of the Stafford automatic loom.

So too, in weaving—higher standards of fabric perfection are invariably reached by the installation of Stafford automatic looms.



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READVILLE, MASS.

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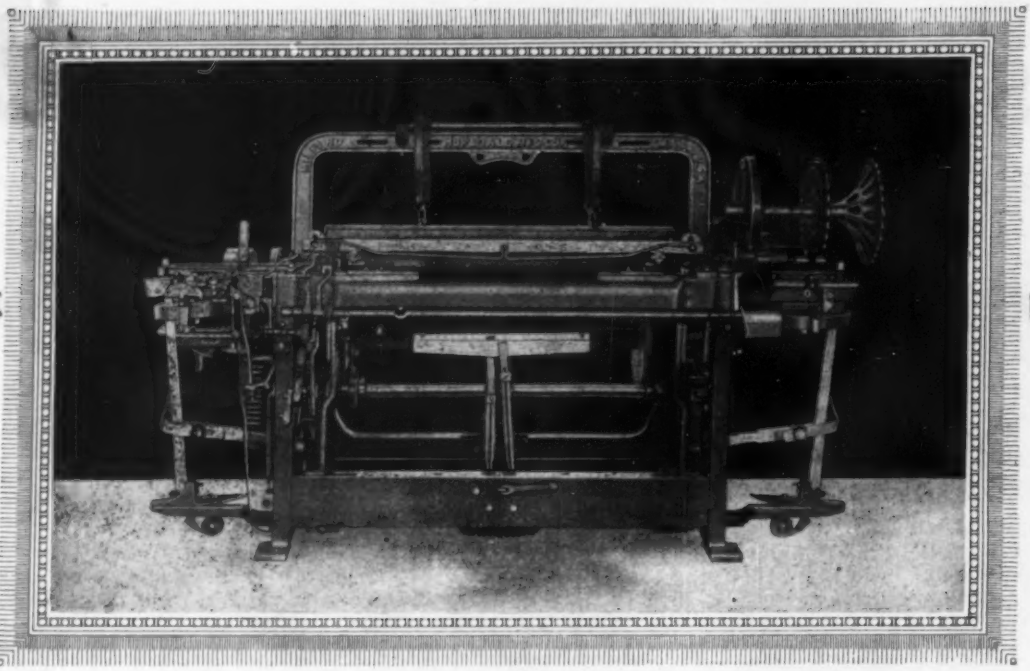

NEW NORDRAY LOOM

BUILT BY

HOPEDALE MFG. CO.

MILFORD, MASS.

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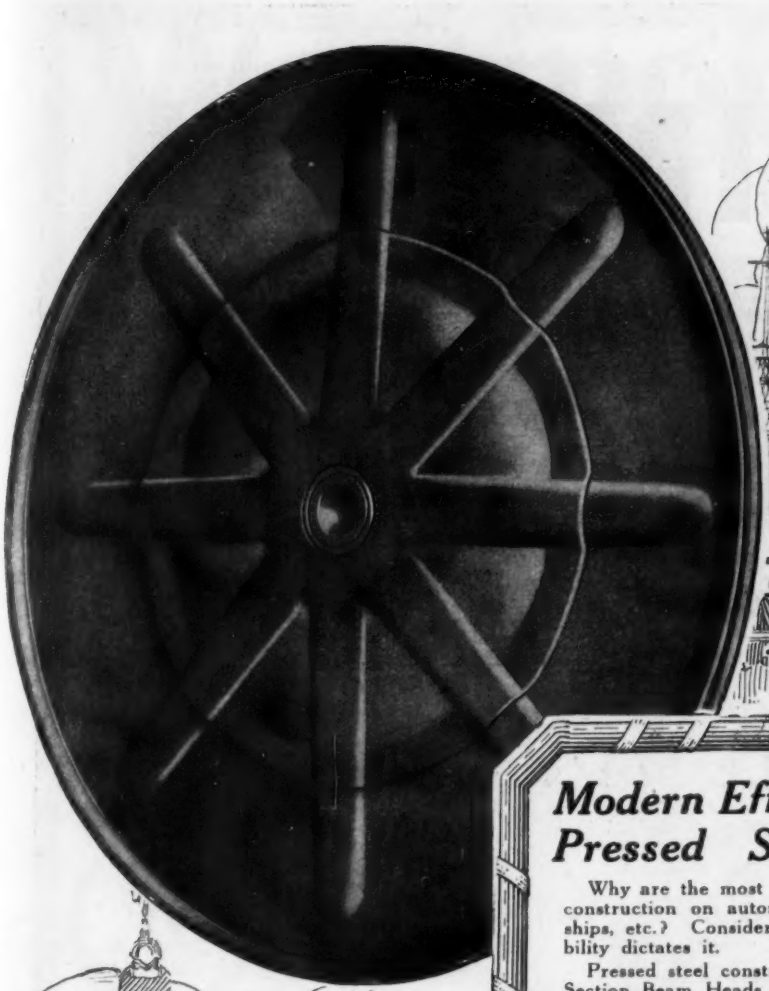
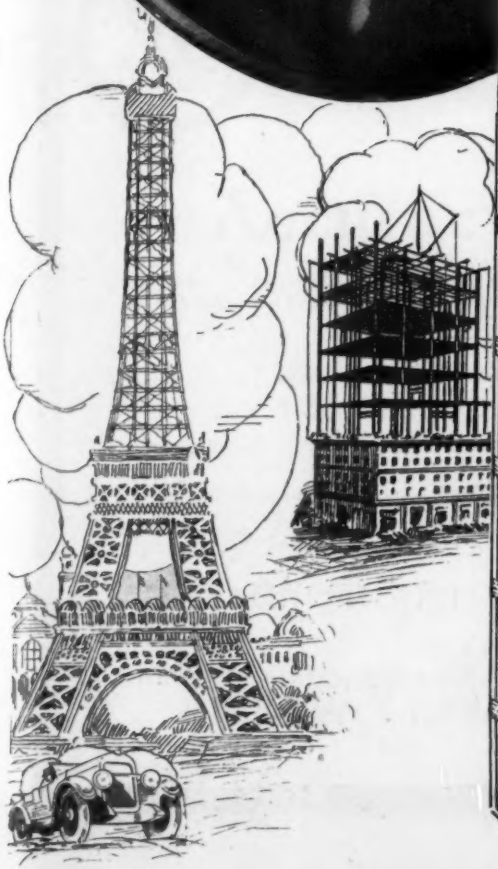
GREENVILLE, S. C.

3,500 NOW RUNNING.

30,000 OF OUR ATTACHMENTS ALSO USED ON LOOMS BUILT BY OTHERS.

GREATER EFFICIENCY WITH LESS PARTS.





Modern Efficiency Demanded
Pressed Steel Construction

Why are the most famous engineers using pressed steel construction on automobiles, aeroplanes, trucks, tractors, ships, etc.? Consideration of lightness, strength and durability dictates it.

Pressed steel construction is used in Mossberg All-Steel Section Beam Heads because we realized the need for a lighter weight and stronger beam head. Now, when costs must be cut in every way possible, should you be interested in the new

MOSSBERG

Pressed Steel Corporation

ALL STEEL SECTION BEAM HEAD

which is a recent development and superior in design, utility, workmanship and durability to any other beam head now on the market. It is the result of careful experimenting and design.

Being 25% lighter in weight than the average cast-iron beam head it is obvious that it saves much time and labor in handling, not to speak of the loss of time necessary to rewind and replace a broken head in case of an accidental drop.

It will not warp, crack nor break—will not bend or spring when the yarn is wound on the beam—will stand the roughest usage and is guaranteed not to break. It of course saves freight charges when beams are shipped between mills.

Let us tell you how it is made. Write for the full story.

Mossberg Pressed Steel Corporation

Attleboro, Mass.

Manufacturers of

Pressed Metal Section and Loom Beam Heads, Spools, Reels, Beams, Jack Spools and "New Process" Drop Wire

Southern Representatives

Walraven Co., 38 W. Alabama St., Atlanta, Ga.

ATKINSON

IMPORTERS

EGYPTIAN COTTON

CARVER BROS. & CO., LTD.

HASERICK

TEXTILE MACHINERY

DOBSON & BARLOW, LTD.

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SOCIETE ALSACIENNE DE CONSTRUCTIONS MECANIQUES

&

MILL SUPPLIES

CO.

BOSTON, MASS. BRADFORD, ENG.

PHILADELPHIA, PA.

SOUTHERN COTTON AGENT: JOHN VANLANDINGHAM & SON CHARLOTTE, N. C.

Westinghouse

REFLECTORS, LAMPS AND LIGHTING FIXTURES

Accuracy---Speed---Safety

Accuracy, speed and safety are absolutely essential in any well managed plant.

Accuracy assures product of quality, without waste; speed reduces production costs, and safety protects the employees from serious accidents and the employers from paying compensations.

Plenty of good light is the solution to efficient operation and competitive production.

Westinghouse industrial lighting equipment, consisting of Cutter Reflectors and Westinghouse Mazda Lamps, cannot be surpassed for correct illumination, low cost of installation and low maintenance costs.

The illustration above shows the interior of a cotton mill, efficiently lighted by the utilization of Cutter Reflectors.

Westinghouse Electric & Manufacturing Company
George Cutter Works, South Bend, Indiana

Good Lighting Costs Less Than Poor Lighting

FIG.20.

Oblong style.

Adapted to use alone or in connection with our Doff Trucks.

Steel frames connected with Lane flexible eye-joints withstand hardest handling. Renewable hardwood shoes secured by rivets and steel plates.

ULTIMATE ECONOMY

FIG.22.

Extra quality strong heavy duck, our own weaving, used exclusively in Lane Baskets.

LANE CANVAS BASKETS AND TRUCKS

FIG.27

This Basket Truck embodies all the advantages of Lane Baskets, plus our specially designed Thread-guard Casters, which are non-clogging. Furnished in either stationary or swivel frame style of generous diameter and tread.

STANDARD EQUIPMENT

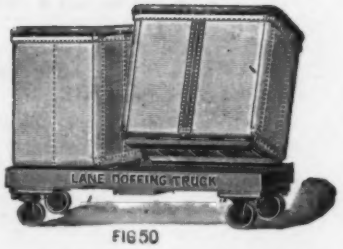
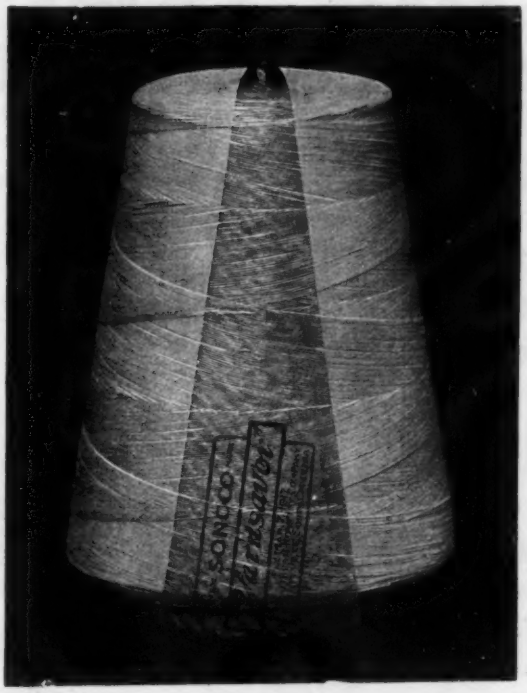


FIG 50

Lane Doffing Trucks are made to wear. Light weight, easy running. Caster equipment as shown or like Fig. 27 Truck.

Send for Catalog No. 75

W. T. LANE & BROTHERS, Manufacturers, Poughkeepsie, N. Y.



The Mold and the Foundation of a Perfect Package:

The cone is the mold and its slightest variation is bound to appear, greatly magnified, in the wound package,—or to cause wobbling, hanging, breakage and waste.

Uniformly perfect "packages" are, of course, the positive result of the uniform accuracy and special surface of the "Sonoco" Cones upon which they are wound.

Sonoco uniformity and accuracy are proven facts, the result of exclusive, automatic methods of manufacture, the most thorough selection and inspection of paper and finished product, and over 20 years of successful experience. The Sonoco surface is an exclusive feature—a necessity to efficient winding.

The same Accuracy, Strength and quality are to be found in "Sonoco" convolute winding tubes, and

"Sonoco Cones"

We want to welcome you to the International Exposition and cordially invite you to make Booth 535 your headquarters and rendezvous.

Southern Novelty Co., Hartsville, S. C.

Manufacturers.

To The Textile Industry

The International Textile Exposition and Power Show

will be held at

BOSTON, MASS.
October 31st to November 5th

MECHANICS BUILDING
Home of the International Textile Exposition
October 31st to November 5th

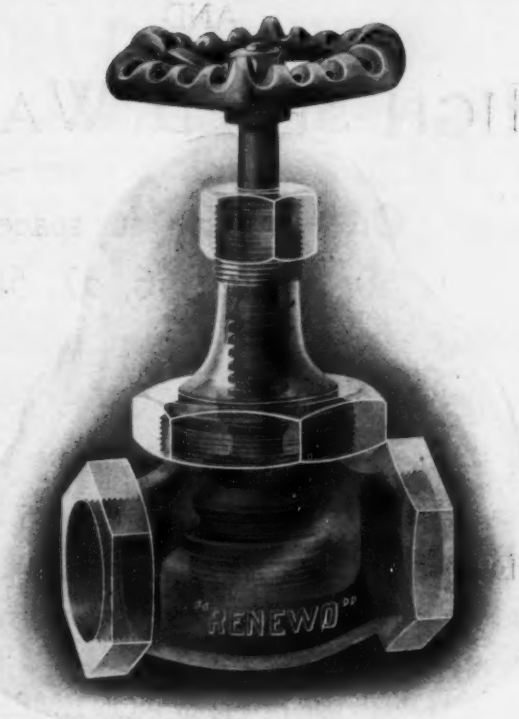
The INTERNATIONAL TEXTILE EXPOSITION and POWER SHOW is an ideal place for buyer and seller to meet—and permits the practical demonstration of new and improved machinery, appliances and accessories.

The largest EXHIBITS of Cotton, Woolen Knitting Machinery and General Textile Products ever held in the world.

CHESTER I. CAMPBELL
Director
5 Park Square Boston

Auspices of the Textile Exhibitors Association, Inc.

LUNKENHEIMER
"Renewo" Valves



The service "Renewo" Valves give; their resistance to wear; their permanence and low upkeep cost recommend them particularly for high pressure steam lines.

The seatring and disc,—the parts subjected to the greatest wear are made of LUNKENHEIMER "valve-nickel"; the seating surfaces are regrindable, and the seatring and disc, together with all other parts are renewable.

With the materials alloyed especially for the duty each part performs; the parts generously proportioned and manufactured under the rigid LUNKENHEIMER method, "RENEWO" Valves represent the acme of perfection in valve construction.

Globe, Angle and Cross Valves with Inside Screw, and with Outside Screw Flanged Yoke Bonnet, and Horizontal and Angle Check Valves for pressures up to 200 and 300 pounds.

The LUNKENHEIMER Distributor in your locality can furnish them. Specify "RENEWO" Valves and insist on having the genuine.

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD
NEW YORK CHICAGO CINCINNATI BOSTON LONDON
EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

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BARBER-COLMAN

AUTOMATIC WINDER

AND

HIGH SPEED WARPER

On exhibition in spaces

50, 51, 52, 56, 57, 58

INTERNATIONAL TEXTILE EXPOSITION
BOSTON

OCTOBER 31, to NOVEMBER 5

1921

BARBER-COLMAN COMPANY
ROCKFORD, ILLINOIS

BOSTON, MASS. GREENVILLE, S. C.

GREIST

LOOM DROP WIRES

MADE of special Heddle Wire, Greist Drop Wires are given a "Satin Finish" by an exclusive process. They are also furnished copper or nickel-plated.

In addition to our many standard designs, we are prepared to make drop wires from your own specifications.

The manufacturing facilities of the Greist Manufacturing Company, since 1871 the largest maufacturers in the world of sewing machine attachments, are a dependable source of supply to rely upon for drop wires.

THE GREIST MANUFACTURING COMPANY
Department C, ∴ New Haven, Connecticut

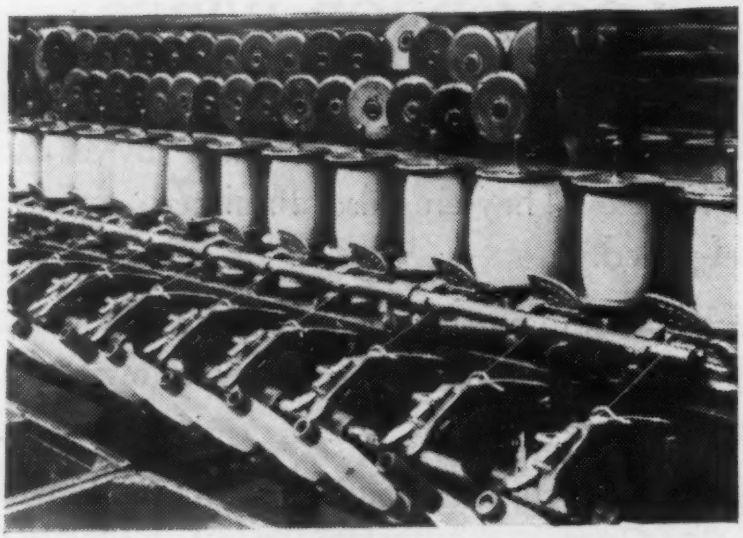
New England Representative:
Boyd's Textile Bureau,
F. W. Boyd, Manager.
339 Butler Exchange,
Providence, R. I.

Southern Representative:
The G. G. Slaughter Machinery Company
Greenville, S. C.

Fall River and New Bedford:
Caldwell Gildard Company,
108 Hartwell Street,
Fall River, Mass.

See our Exhibit, Space No. 174,
International Textile Exposition.

A Practical Spooler Tension That Works



L-V-B Tension Device in New Bedford Mills.

L-V-B SPOOLER TENSION

Produces Greater Production and Better Spinning.

Change from Warp to Filling Wind. Try it out at our expense.

Send 2 filled bobbins and we will forward sample tension on approval.

50% Saving in Waste. Ask for a list of Mills that are using L-V-B Tensions.

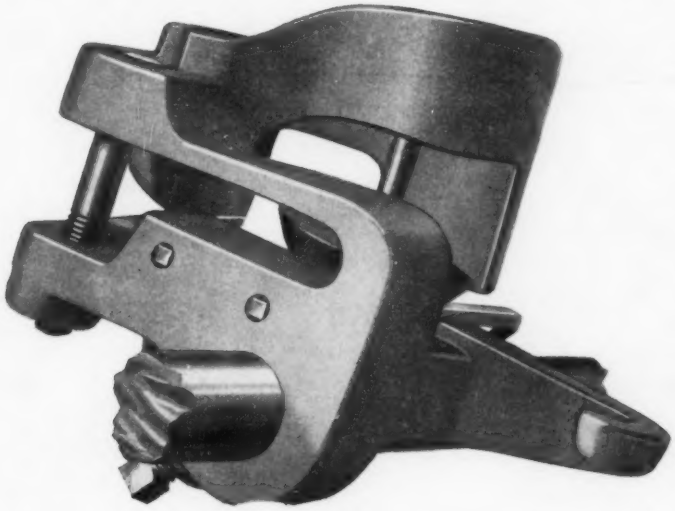
Address

Textile Specialty Company

P. O. Box 531, New Bedford, Mass.

THE FOSTER MACHINE CO.

will give a complete demonstration of Foster Winders and Winding Economies applied to Textile Manufacturing, at the International Textile Exposition, Boston, October 31st to November 5th.



THE FOSTER AUTOMATIC TENSION - GUIDE

combines a Tension, Slub-Catcher, Cleaning Grid and Guide in the one attachment. It can be used on all makes of Spoolers.

The Automatic Threading feature lowers the cost of filling wind spooling to that of warp wind spooling and makes the economy of filling wind spooling available to cloth and yarn mills that now use the warp system.

This attachment will be demonstrated by the Foster Machine Company at their exhibit in Boston.

FOSTER MACHINE COMPANY

WESTFIELD, MASS.

John Hill, Southern Representative, Healey Bldg., Atlanta, Georgia.

THE MORSE "ROCKER JOINT"

THE ROCKER JOINT SILENT CH

MORSE

Flexible as a Belt

On Spinning

RUN COOL, OIL BATHS NOT REQUIRED

OPERATES QUIETLY

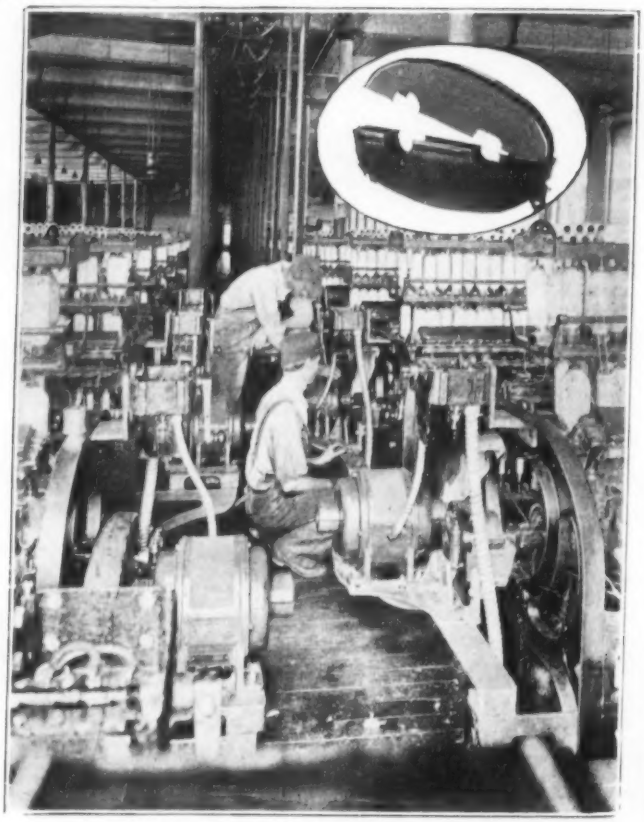
GUIDE LINKS HOLD CHAIN ON LINE

BETTER PLANT LAYOUT

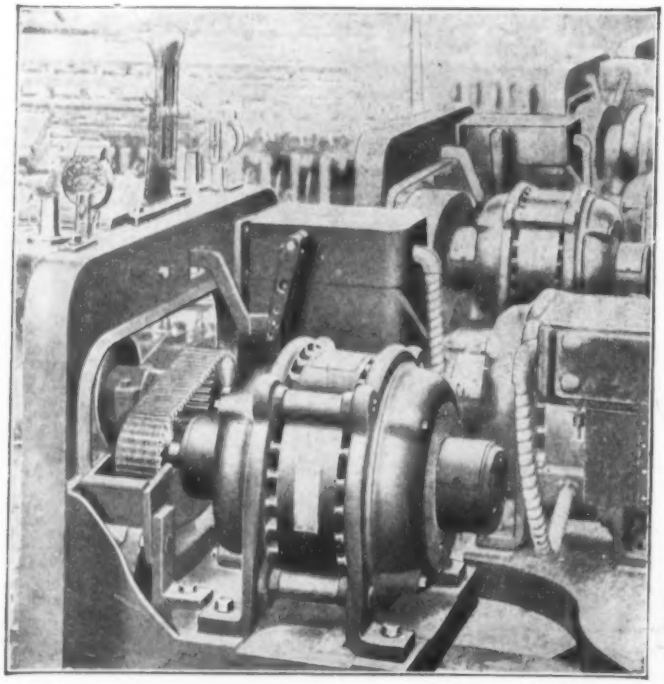
UNIFORM SPEED INCREASING PRODUCTION

BETTER LIGHTING

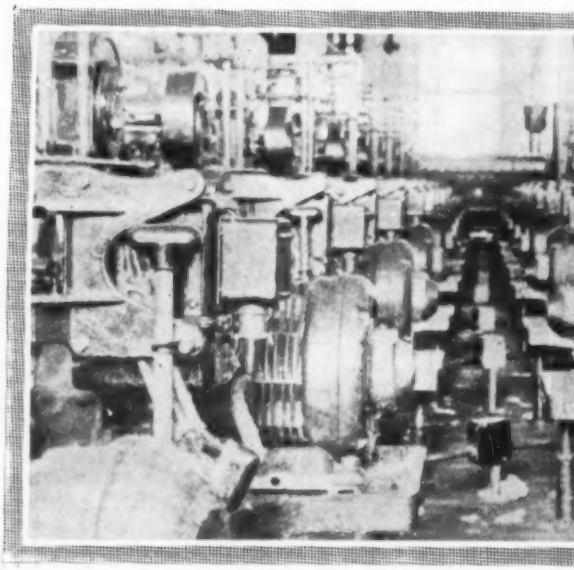
ANY REDUCTION IN SPEED IS POSSIBLE



Changing over Savon Mills, Spartanburg, S. C. J. E. Sirrine, Mill Engineers and Architects



Close Setting, Standard Spinning Frame Drive.



Lynchburg Cotton Mill Co., Lynchburg, Va., Lo

SAVE Construction, Space, Light, Fuel, Pro

Engineers Planning Power Transmissions Secu

"MORSE" Drives.

MORSE CHAIN CO., LARGEST MANU SILENT CHAINS

MORSE ENGINEERING SERVICE AS

Baltimore, Boston, Chicago, Cleveland, Kansas City, Detroit, Charlotte, N. C., New York

"Morse is the Guarantee Always Behind the

NT CHAIN WITH CENTER GUIDE LINKS

SILENT CHAIN

THE MORSE "ROCKER JOINT"

DRIVES

Positive as Gears

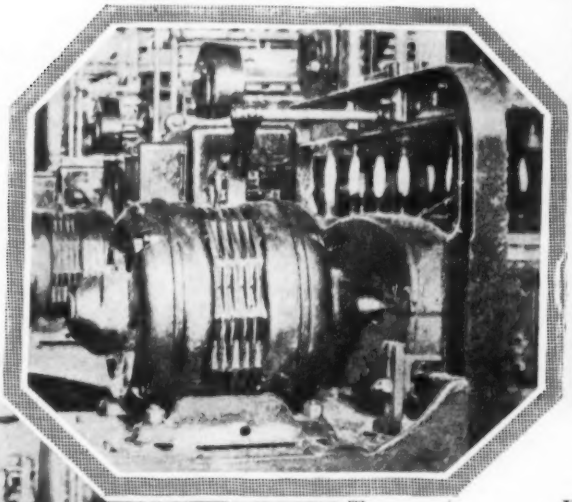
ng Frame Drives

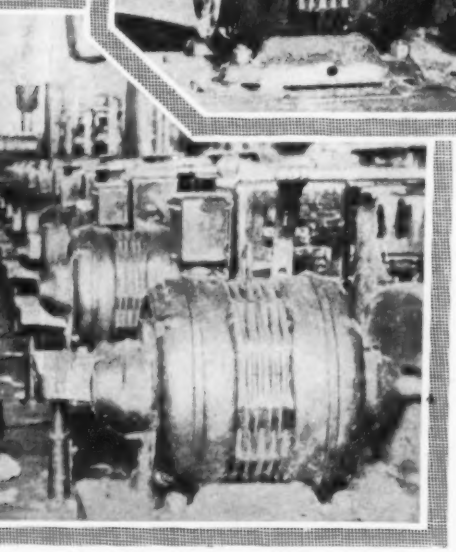
THS

SMOOTH RUNNING
IMPROVING QUALITY
POSITIVE
SPEED RATIOS

PLANT
T

IN
LE





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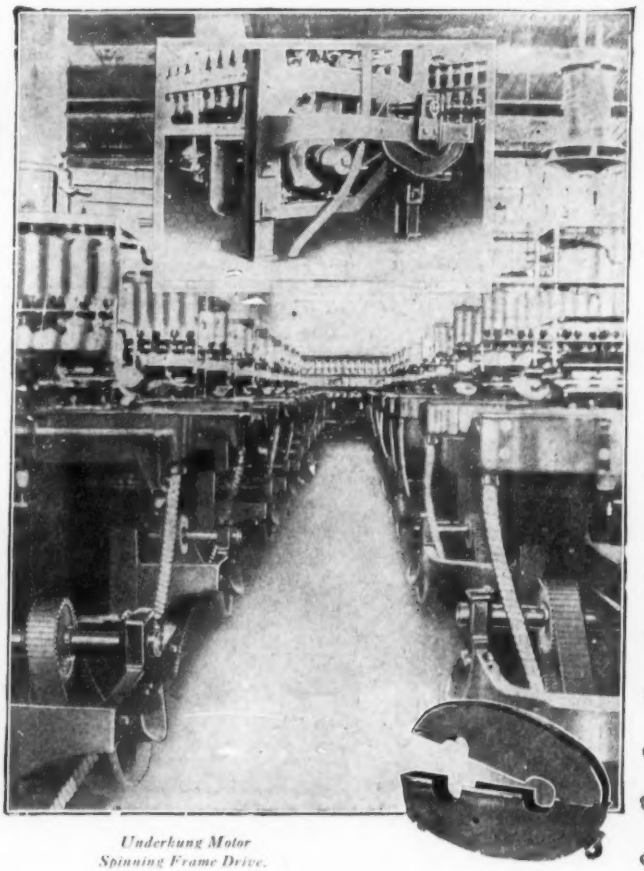
MORSE CHAIN COMPANY ITHACA, NEW YORK

the Efficiency, Durability and Service"

THE MORSE "ROCKER JOINT"



Underhung Motor Spinning Frame Drive.

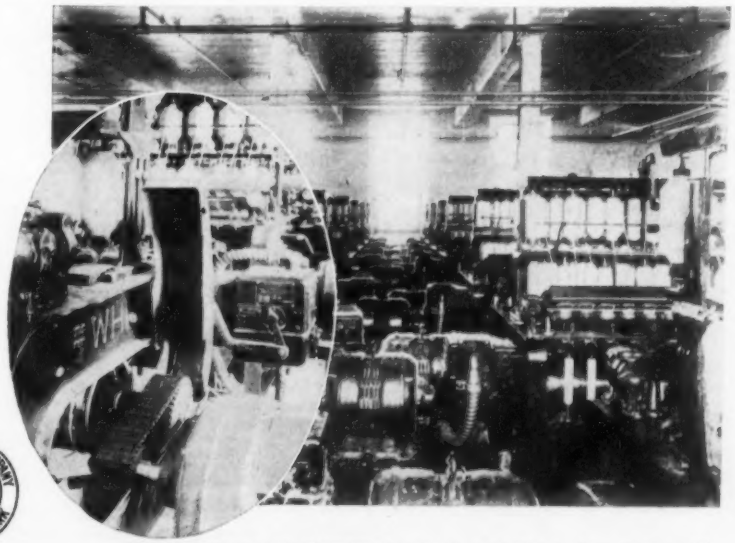
Drawn Steel Chain Case

DURABLE

WITHOUT SLIP

FREEDOM FROM OVERHEAD CONSTRUCTION

CLEANLINESS — CONGENIAL WORKING SURROUNDINGS



This Rhode Island mill, "MORSE" equipped. One 450 h.p. drive and one 275 h.p. drive to 320 K. W. and 200 K. W. Generators. Three 10 h.p. drives and Six 15 h.p. drives connecting motors to line shafts. Three hundred and Seventy-Five drives connecting 5 h.p. and 7 1-2 h.p. individual motors to Spinning Frames.

The High Efficiency Belting

Stronger and Cheaper than Leather

"Fabreeka" Belting has achieved a wonderful record for itself among textile mills, proving in actual tests that no other belting surpasses it in efficiency, durability and strength. It is not only more economical in purchase price, but proves economical in the long run.

Expressions of satisfaction and approval are constantly being received from mills all over the country. A big spinning mill in Fall River, Mass., placed a new first-grade single leather belt on one pulley and a heavy single "Fabreeka" Belt on the other pulley on the same side of the motor of a spinning frame. After running both two months the superintendent states "The leather belt has been taken up six times while the 'Fabreeka' belt has never been touched. Speed of the machines have been checked up several times and while that of the machine driven with leather has varied greatly, necessitating the taking up of the belt, the speed of the machine driven with 'Fabreeka' has never changed."

A plant in Springfield, Ohio, before adopting Fabreeka belting made a stretch test comparing "Fabreeka" cotton and leather belting. After a long severe test, under actual working conditions, "Fabreeka" proved conclusively that it was the superior belt of the three. They are now specifying "Fabreeka" to take the place of other belting in their plant.

Fabreeka Belting

has won the admiration of all careful observers by its wonderful performances on what had been known as impossible drives.

"Fabreeka" has the same appearance of leather, has the same condensed fibre as leather and corresponds with leather in thickness and weight. But it works better than leather and costs less than leather. Has no joints or weak places so runs smoothly and evenly. Its tensile strength is greater than leather.

"Fabreeka" never slips, giving a pulley contact impossible with leather. It is very pliable and remains so, requiring no dressing of any kind. Impossible to side stretch it.

"Fabreeka" is water, steam and weather proof. Cannot shrink under any condition. It is also impervious to acid fumes and gases. It will not slip when wet.

"Fabreeka" runs smoothly and noiselessly and absolutely true on pulleys. No flapping or vibrating. The only belting that contains the desired pressure on air compressors. For high speed it is in a class by itself and attains a degree of efficiency unknown in leather belts.

"Fabreeka" is doing the work better and relieving the troubles of many belt users where conditions were considered beyond relief. You cannot appreciate its value until you try it. Less first cost, less stoppages from belt troubles, a saving of power and increased production result from its use.

Write Today for Full Information and Prices

Fabreeka Belting Company

30 India Street, Boston, Mass.

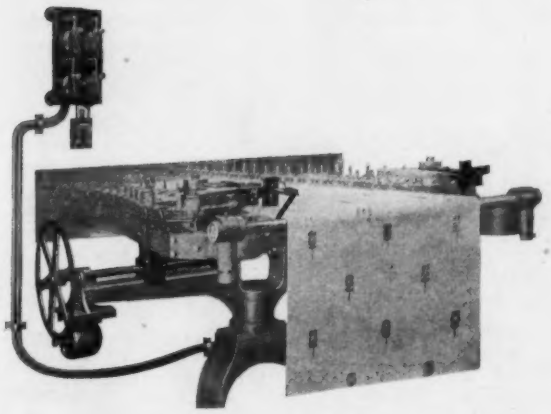
The Schwartz Automatic Electric Guider

For

Straight and Swing Tenter Frames

Handles cloth of any kind, weight or width

A Labor-Saving Attachment of Proven Efficiency



Specified in the largest mills in the country

Manufactured and Distributed by

Blake Electric Mfg. Company

1 Rowes Wharf, Boston, Mass.

For information write Dept. G.

WE THANK YOU

The close of business, August 31st, 1921, rounded out our first year as ATLANTA BRUSH COMPANY, successors to D. D. Felton Brush Co.

It is our desire at this time to thank the Textile and other Industries for their unstinted support and patronage, assuring them that it was highly appreciated, and we trust that the service which we rendered will warrant a continuance of the same in the future.

During the past year all lines of endeavor have suffered its share of loss, due to the re-adjustment of business conditions.

We took ours gracefully and pleasantly, reducing our prices to a minimum, consistent with the maintenance of quality, feeling that if we did our part soon normal prosperous time would be with us.

That we were right in our surmise, is borne out by present changing conditions.

Everywhere there is an underlying spirit of optimism. The wholesaler, the jobber and the retailer are resuming purchases for the replenishment of their stocks. Bankers are showing courage and confidence by cooperating with the farmers, the merchants and the manufacturers.

THERE IS A NEW SPIRIT EVERYWHERE.

In the past Textile and other industries have made their BRUSH purchases in small quantities and requested prompt and immediate shipment, which request we have been most careful to comply with.

Conditions are now changing. New business is developing rapidly. "GOOD TIMES" have come again to the South.

THE WISE MILL OWNER WILL PLACE HIS ORDERS FOR BRUSHES AND REPAIR WORK AT THE EARLIEST POSSIBLE MOMENT, IN ORDER THAT HE MAY RECEIVE PROMPT AND EFFICIENT SERVICE, AS BUSINESS IS FAST APPROACHING NORMAL.

WE MAKE BRUSHES FOR EVERY PURPOSE. OUR CATALOG TELLS THE WHOLE STORY. WANT ONE?

Atlanta Brush Company

Successors to D. D. Felton Brush Co.

Central and Trinity Aves. Atlanta, Ga.

Are your missionaries in these bazaars?

CONSTANTINOPLE, Bombay, Calcutta—*the very names arouse visions of rich commerce.* But woe to the trade missionary who rushes in to sweep these markets sensationally! With many habits of life that were firmly fixed centuries before Columbus sailed from Spain, the people do not yield readily to the persuasions of strangers.

Find a manufacturer who has established a market for his goods in the Orient and you will meet *a patient builder* whose vision sees beyond immediate profit. Importer or exporter, your success there hinges upon gaining the slowly conceded confidence of able merchants *who test before they trust.*

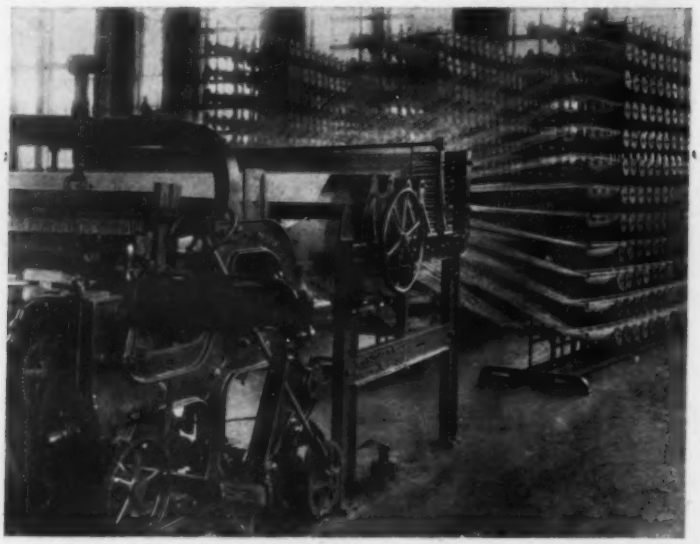
WRITE FOR COPIES OF OUR BOOKLETS:
Foreign Exchange
The Webb Law
The Edge Law
Acceptances
Scandinavia

The National Shawmut Bank is represented in all the important centers by influential local banks with which this bank has affiliations. An important advantage enjoyed by Shawmut clients is our investigation and trade counsel service—especially valuable to those about to make an initial sales effort in any part of the Near East.

THE NATIONAL SHAWMUT BANK *of* BOSTON

Capital, surplus and undivided profits, $22,000,000

DIRECT WEAVING OUTFITS FOR CORD FABRIC

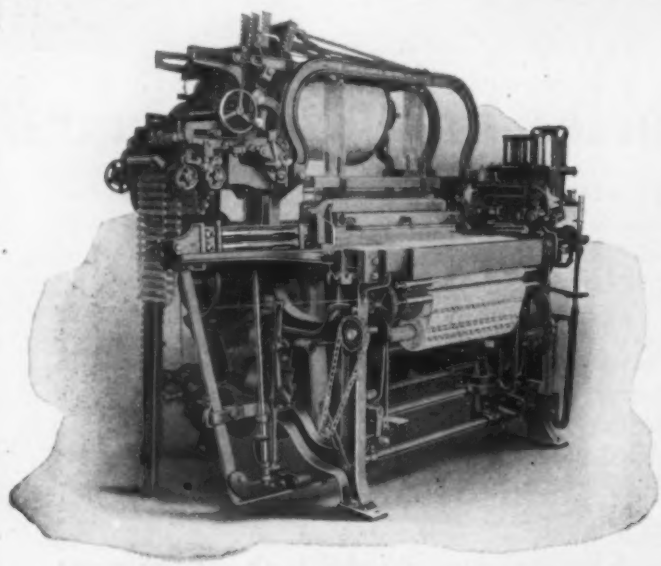


WARPER CREEL and TENSION DRESSER in connection with cord fabric loom

HIGHEST EFFICIENCY TEST IN YOUR GOODS. Production plus QUALITY

WARP COMPRESSING MACHINE CO. -:- Worcester, Mass. U. S. A.

Representative: F. W. KIESSLING, *Worcester, Mass.*



Automatic Terry Towel Loom

The AUTOMATIC TERRY TOWEL LOOM shown here, is of the Dobby type and is used for weaving towels with colored borders.

A large number of these looms are running successfully with increased production per weaver and greatly reduced operating costs.

CROMPTON & KNOWLES LOOM WORKS

—WORCESTER, MASS.—

PROVIDENCE, R. I. PHILADELPHIA, PA. PATERSON, N. J.

ALEXANDER & GARSED—Charlotte, N. C.—Southern Representatives

American Textile Machinery Corp., 47 Ave. de l'Opera, Paris—Representatives for Continental Europe

Are YOUR Floors Clean?

THREE plants! Chosen at random and impartially investigated by an engineer. What is revealed?

Note that the *best* is scrupulously *clean*. Efficiency goes hand in hand with cleanliness. Dirtiness breeds gloominess, laziness, discontent.

Cleanliness stimulates morals. Cleanliness plays an important part in better work, higher production, less waste. Cleanliness—which *starts* with CLEAN FLOORS—makes you better able to compete with your associates in trade.

When you start your plant in production. Start with
CLEAN FLOORS

AMERICAN SCRUBBING EQUIPMENT COMPANY

Also Manufacturers of
FINOLA SCOURING POWDER

General Offices and Factores—
1229 Collier St.
Hannibal, Mo.

DISTRICT OFFICES

ATLANTA
BALTIMORE
BOSTON
BUFFALO
CHICAGO
CLEVELAND
DENVER
DETROIT
KANSAS CITY
LOS ANGELES
MILWAUKEE
MINNEAPOLIS
NEWARK
NEW ORLEANS
NEW YORK
PHILADELPHIA
PITTSBURGH
ST. LOUIS
SALT LAKE CITY
SAN FRANCISCO

Note

...into and of every man a word," said James A. G...

MEN AND BUSINESS

An engineer who made a study of three industrial establishments engaged in manufacturing the same kind of metal goods in the same territory submitted a report of conditions in the plants and offices of the concerns. In view of Secretary Hoover's declaration as to the waste in management this report may be illuminating.

There is nothing in the engineer's finding bearing on the wage scale. It is to be supposed it is the same in each case. There is nothing either as to costs, but the reader is likely to draw his own deductions in that regard.

A dispassionate person would say the management of plant number 1, is stupid and obstinate, destined in time to bring bad results.

But there are establishments more or less similar to number 1 in all branches of industry. You have examples innumerable all along the line from concerns employing thousands of persons down to the small retail store.

This country needs efficiency in every branch today more than ever before in its history. It must broaden its foreign markets, for its productive capacity is beyond its domestic requirements. It is going to have more competition and sharper than ever before.

It has great advantages in abundance of raw materials, together with cheaper fuel and better workmen than the European nations. These advantages are offset in part by a higher wage scale. The high wage scale of America can be maintained by the elimination of wastes. Good management means good men.

Here is the engineer's report:

Number One.

"Buildings: Largest plant. Structures of poor design. Interior gloomy and dirty.

"Mechanical equipment: Rates third. Some machines new but many old type. Accident prevention not good. Not clean.

"Human element of plant: Big, husky foreigners. Dissatisfied. Little respect for chiefs. Dirty. No spirit of friendliness. No American workmen. Human element in office: Slow, heavy-looking foreign type much in evidence. Few smiles. Most of men cold. Greetings lack genuineness. Atmosphere gloomy.

"Plant product: Good. Result of rigid inspection. Little originality.

"Spirit of the works: Manager says, 'We own our product from the metal to the market and can meet any competition.'

"Education: No college men. Distrust and jealousy of men with technical training. College men considered impractical.

Number Two.

"Buildings: Same size as No. 3. Well lighted. Well designed. Scrupulously clean.

"Mechanical equipment: First in efficiency of machinery. Machines clean. Good accident-prevention guards.

"Human element of plant: Clean, keen, intelligent-looking foreigners in majority. Satisfied. Friendly. Show respect for bosses.

"Human element in office: Young, clean-cut and alert. Americans predominate, even to the elders. No false haste. Smiles even over telephone. Officers sunny and cheerful.

"Plant product: Better. Workers show pride in output.

"Spirit of the works: Manager says, 'you will find our personnel proud of their product and pleasant and agreeable to work with.'

"Education: You'd think most of the officers were college men, but they are not. Mostly clean-cut and intelligent.

Number Three.

"Buildings: Best design. Best lighted. Clean, but not so clean as No. 2.

"Mechanical equipment: Close up to No. 2 in efficiency and cleanliness of machines. Best accident-prevention guards.

"Human element of plant: Large percentage of American. Not very clean. Not hostile, friendly. Indifferent but efficient. Little or no lost motion.

"Human element in office: Efficient Americans in general. Little fellowship. Strictly business. Offices well lighted and well equipped.

"Plant product: Good. Result of efficiency.

"Spirit of the works: Manager says, 'merit counts here and no man is limited except by his ability.'

"Education: Mixture of college men and those who have come up from the ranks. No jealousy."

In 1914 there were 275,791 manufacturing establishments in the United States employing 7,036,337 persons. Today there probably are 350,000, which in normal times would employ perhaps 9,000,000 or 10,000,000 persons. Questions of light, ventilation, mental attitude and general efficiency assume great importance when measured by the output of such a gigantic army of workers.

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Bureau of Information.

A bureau of information fo... use of our subscribers, ad... and friends will be establis... booth of The Chicago ... Commerce at the Pag... ress. All will be welc... Section A—Newspa...

CLIPPING FROM THE CHICAGO JOURNAL OF COMMERCE AUGUST, 9, 1921.

CLEAN FLOORS REFLECT CLEAN BUSINESS

Howard Bros. Mfg. Co.

Established 1866

Atlanta, Ga. Worcester, Mass. Philadelphia, Pa.

CARD CLOTHING

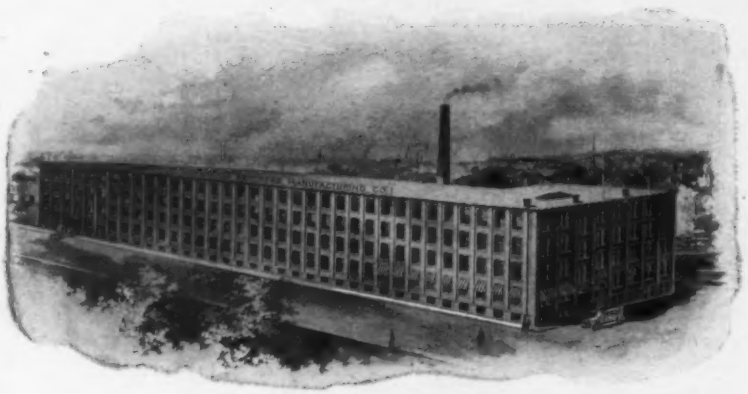
Napper Clothing

Wire Heddles

Cylinder Fillets

Doffer Fillets

Top Flats Reclothed



Hand Stripping Cards

Stripper Fillets

Burnisher Fillets

Emery Fillets

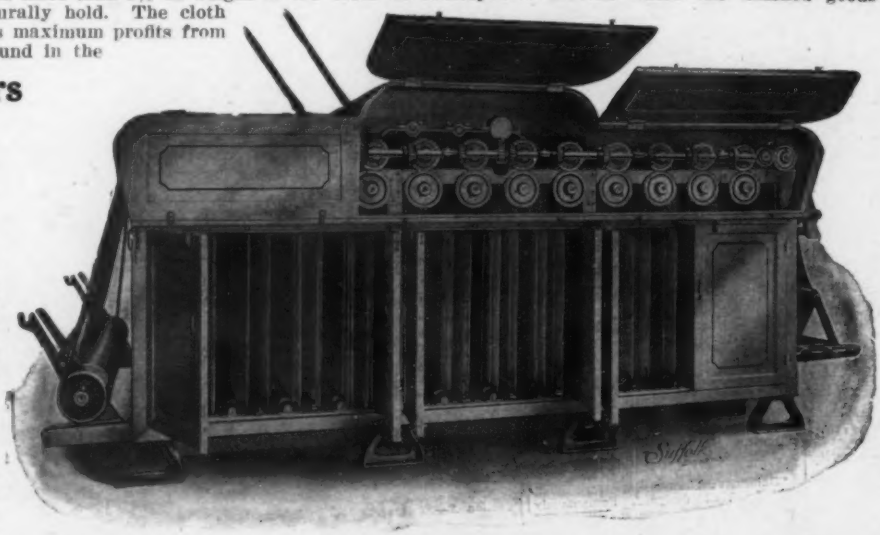
Southern Agents

E. M. TERRYBERRY, 1126 Healey Building, ATLANTA, GA.

Don't Throw Away 5% of Your Cloth

Of course ,you wouldn't throw away 5% of your cloth if you knew it, but probably you didn't know that ordinary methods of pressing removes more than 5% of weight in the form of atmospheric content which the finished goods should rightfully and naturally hold. The cloth regain process that insures maximum profits from your products has been found in the

Manufacturers Cooling and Conditioning Machine



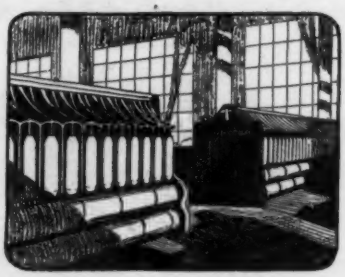
which is a patented process, based on the operation of natural laws. It takes the dry, hot material as it leaves the dryer or press and restores the weight and dimension to the right amount that a good cloth should have. The fabric leaves the machine thoroughly cooled, minus static electricity which of course improves the handle, and there is imparted to it a rich softness entirely free from shadiness so often caused in uneven cooling. The finish is perfect and the color uniform.

The gain in weight alone is enough to pay for this machine in a short while.

Write today for complete information.

MANUFACTURERS MACHINE COMPANY

Sales Department, 120 Milk St., Boston, Mass.
Factory: North Andover, Mass.



Monday Morning *and* 10,000 *Idle Spindles*

Monday morning—*and 10,000 idle spindles.*

It was a large southern textile mill of 70,000 spindles. And one-seventh of its frames were silent.

Lack of orders?—No, the company was behind with its production, straining every nerve to catch up.

Labor shortage?—No, the mill had been fortunate—its ranks were filled with capable workers.

Epidemic?—No and yes—for it was not an epidemic of disease, but an epidemic of family washings.

Fifteen per cent of this fine big mill's trained women workers were at home bending over the wash-tub.

And that Monday morning marked the birth of an idea—the Chief found it in an advertisement of the American Mill Village Laundry.

A letter—a consultation—an expert survey—details for a plant—a contract—prompt installation—weeks devoted to the training of an operating staff—and the Mill Village Laundry was ready for business.

Then came another Monday morning.

Seventy thousand spindles whirring merrily.

Row upon row of busy frames, tended by contented, neatly-clad workers.

"How does it stack up?" the Chief asked the Superintendent.

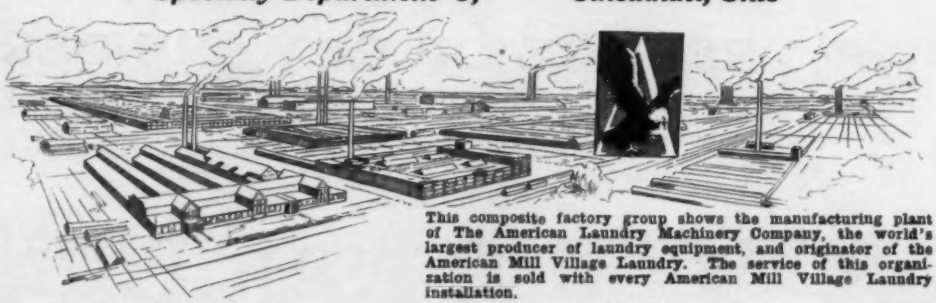
"Fine—wonderful!" was the reply. "Five absent to greet the stork; eight sick; a half-dozen away on vacation leave—but not a single wash-tub deserter!"

That is what an American Mill Village Laundry did for one mill. It has done as much or more for dozens of others—it will do the same for you.

Ask us about it TODAY.

The American Laundry Machinery Company

Specialty Department C, Cincinnati, Ohio



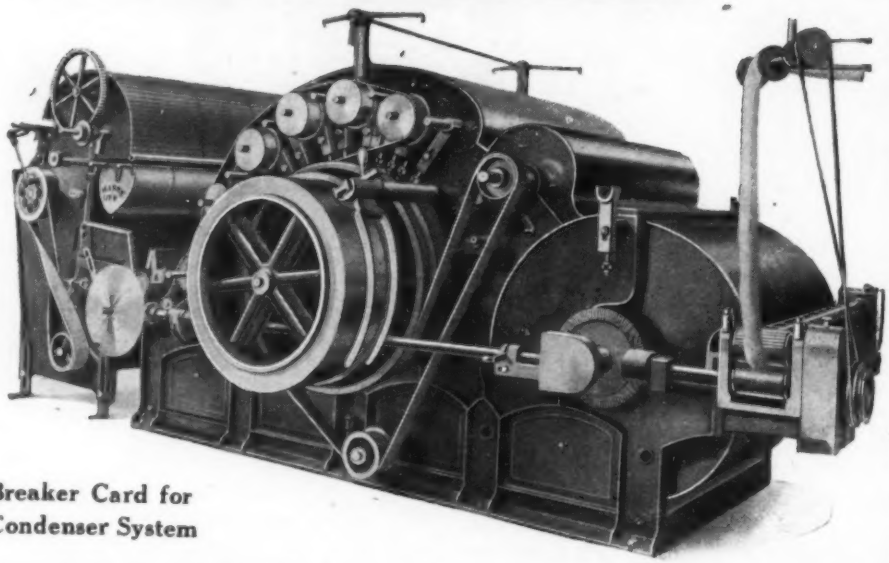
This composite factory group shows the manufacturing plant of The American Laundry Machinery Company, the world's largest producer of laundry equipment, and originator of the American Mill Village Laundry. The service of this organization is sold with every American Mill Village Laundry installation.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY

Makers of Carding Machinery for Wool, Cotton, Cotton Waste, Asbestos, etc.

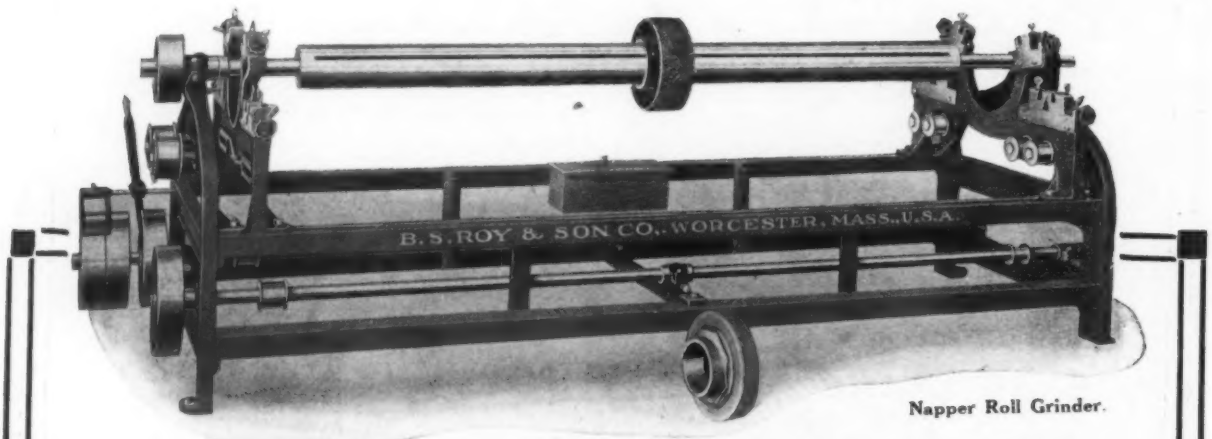


Breaker Card for Condenser System

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.



Napper Roll Grinder.

THE PRESTIGE OF ROY GRINDERS

Roy prestige is built on a foundation of over 50 years of leadership in the textile grinding machine world. This leadership was gained only through the production of a grinding machine excelling in efficiency and reliability.

The proof is in the fact that Roy Grinders are universally used, and will stand the test of hard usage.

Roy Grinders have proved a good investment for the other representative mills throughout the country —why not for YOUR mill?

Write for Bulletins

B. S. ROY & SON CO., Worcester, Mass.

ESTABLISHED 1868

E. M. TERRYBERRY, *Southern Agent*
1126 Healey Bldg., Atlanta, Ga.

Canadian Representative
W. J. WESTAWAY CO., LTD.,
Hamilton, Canada

Every piece of printed matter that emanates from your establishment has, or should have, the power to benefit business.

No matter how strong and unwavering a printer's determination to do good work, he and his customers are doomed to disappointment unless he has in his possession the two prime requisites—the plant and the experience.

We have both. Our plant, established in Atlanta thirty-four years ago, is equipped with every down-to-date facility for producing good printing and producing it economically.

We have a complete plant. Our building has four floors, every inch of which is economically utilized. Every department is conveniently arranged so that the highest degree of efficiency is obtained. Every piece of machinery is the latest model for producing perfect printed matter.

Included in our equipment are eight cylinder presses, three marvelous Dexter folding machines, with wire stitching and covering attachments, four linotype machines and six monotypes, electrotype foundry, steel plate department, engraving department and bindery. In every department, we have exceptional facilities and every department works in harmony.

We are in position to give you work that will please you on your—

House Organs	Mill Forms
Booklets	Stock Record Sheets
Circulars	Business Cards
Labels	Letter Heads
Stickers	Loose Leaf Ledgers
Announcements	Outfits and Binders

(In colors or black and white)

Our specialists will be pleased to call upon you in connection with whatever work you are planning. They will submit ideas to you, give you the advantage of their printing experience and render you that personal interest that insures perfect execution of your wishes.

We have handled some of the largest orders for printing ever given in the South.

Our Booklet "An Exposition of Efficiency" will tell you more in detail of our facilities and service. Send for your copy today.

PRODUCTIVE PRINTING

"Your picker sticks are the best we have ever used"

Unsolicited, this comes to us from a mill whose picker stick requirements are very exacting. The mill weaves heavy fabric and their sticks are called on to do very heavy work. Nothing but a first-class stick will answer their purpose.

This stick is somewhat heavier than the ordinary cotton or woolen stick but it was made from the same class of selected Hickory which we use in all our supplies. Our sticks are bound to give long service. If they don't, you do not have to pay for them.

Try a few of them free, before ordering again

Southern Bending Co.
Johnson City, Tenn.

Shambow Shuttles

We Are Exclusive Representatives for

MOSSBERG PRESSED STEEL CORPN.
SHAMBOW SHUTTLE CO. HENDEY MACHINE TOOL CO.
BROWN & SHARPE MFG. CO. MONARCH MACHINE TOOL CO.

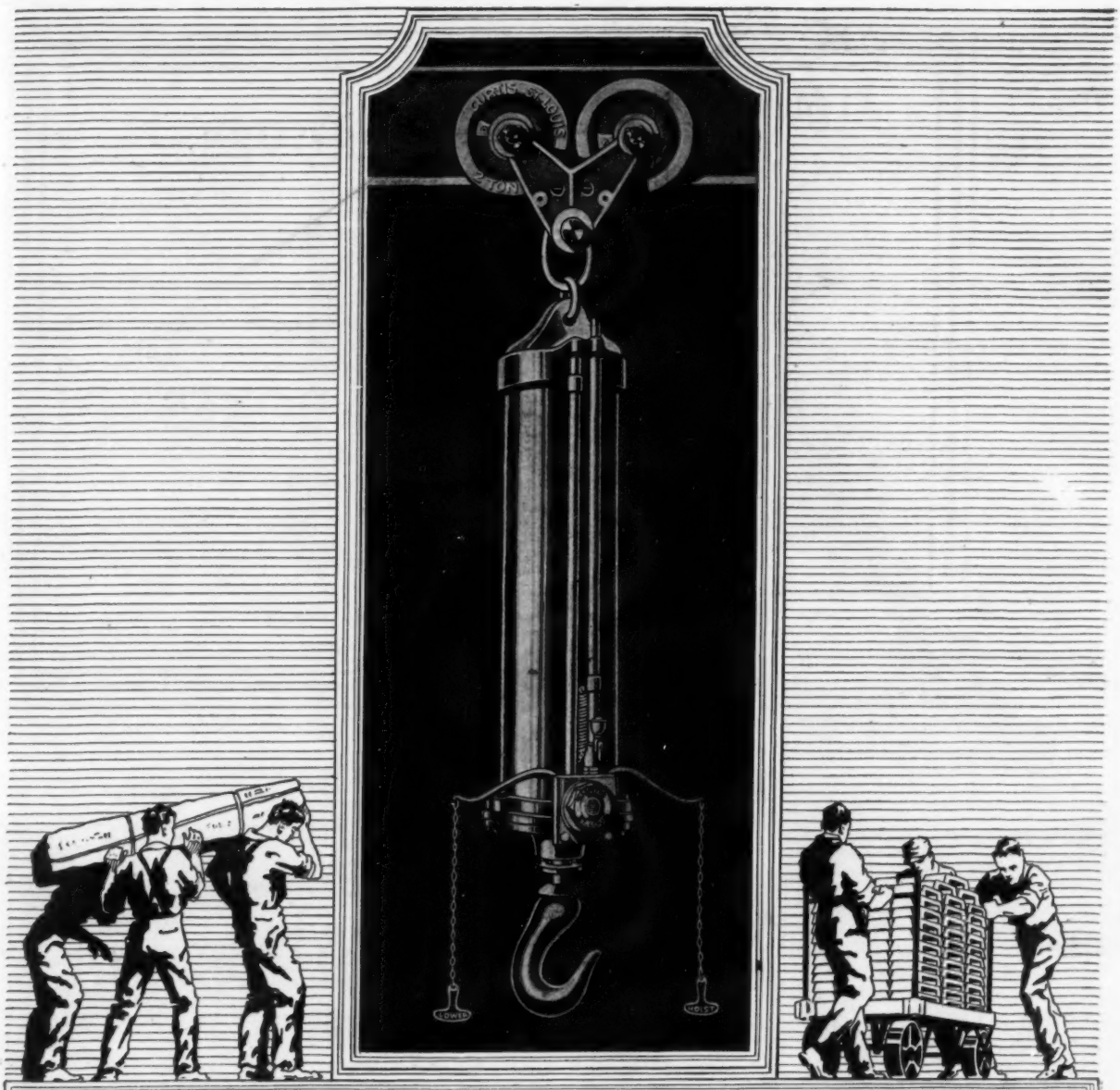
When you are in the market for any of the following products, you can secure complete satisfaction and the kind of service you like from Walraven.

MOSSBERG PRESSED STEEL BEAM HEADS

SHUTTLES	BELTING	PULLEYS	VALVES	GEAR CUTTERS
BOBBINS	HOSE	HANGERS	FITTINGS	MILLING MACHINES
SPOOLS	PACKING	SHAFTING	PIPE	LATHES, DRILLS, ETC.

Write, Wire or Telephone Us.

The **WALRAVEN** *Co.*
Machinery and Mill Supplies
38 West Alabama St. Atlanta, Ga.



CURTIS AIR HOISTS and TROLLEYS
SAVE MAN-POWER

CURTIS Trolleys are constructed with self-equalizing steel side frames and large inclined wheels fitted with shock-absorbing Hyatt Flexible Roller Bearings—making them easy to start—easy rolling and long lasting.

CURTIS All-Steel Air Hoists, in design and construction, present the perfected results of 25 years of manufacture. They are simple, safe and economical for light and medium loads. Capacities, 800 to 20,000 lbs.

CURTIS PNEUMATIC MACHINERY COMPANY

1571 Kienlen Avenue ST. LOUIS, U. S. A.

Branch Office: 532-R Hudson Terminal, New York City

JIMMY SHOOK SAYS: EXPERIENCE PROVES

—that goods sell better when attractively packed

There is no more attractive package than a bright clean wood box

The quality of a commodity is usually judged by the package in which it comes

Treat your product right. Pack it in

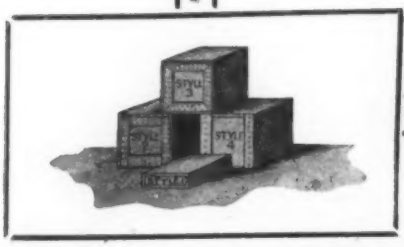
BROOME'S WOOD BOXES

THE BETTER KIND

Manufactured from North Carolina air dried Pine and Gum

LET US GIVE YOU AN ESTIMATE ON YOUR WOOD BOX REQUIREMENTS

W. P. BROOME & SON
Peachland, North Carolina



VERMONT SPOOL & BOBBIN CO.
OF
BURLINGTON, VERMONT.

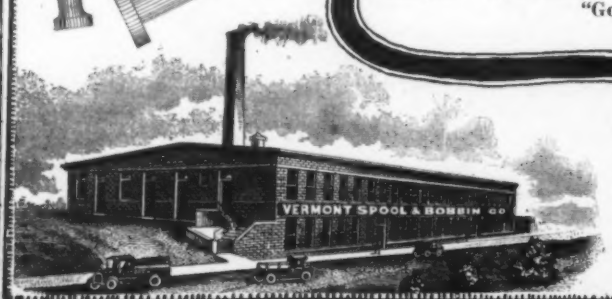
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.

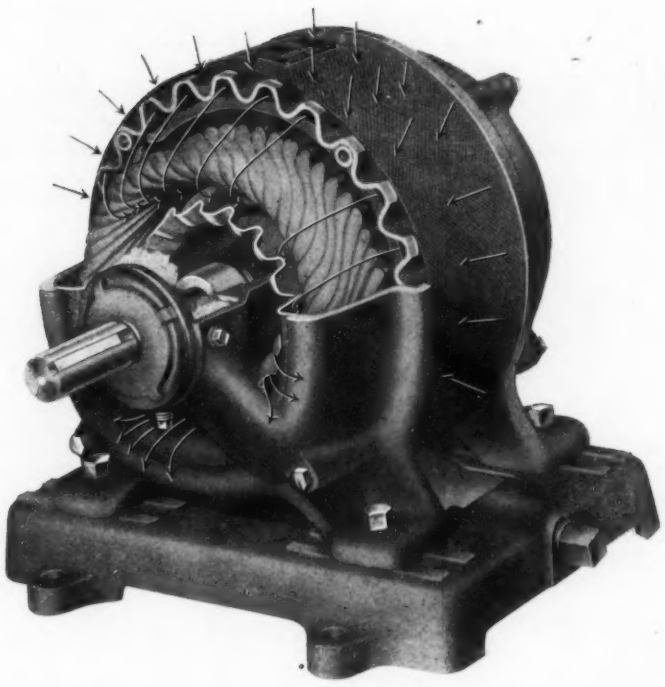
Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.

Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.

Give us a trial order and you will remain one of our satisfied customers. Write for prices.

"Good Goods at Fair Prices."





Motor Service in Cotton Mills

These motors are manufactured for Polyphase circuits of standard frequency and voltages in ratings up to and including 25 H.P. at 1800 revolutions per minute, and the corresponding lower speed ratings.

They will operate at normal rating with a temperature rise not exceeding 40°C., and carry a 25 per cent continuous overload at a temperature rise of not more than 50°C.

COMPLETE LITERATURE SENT ON REQUEST

The necessity for reducing costs compels every textile manufacturer to question any buying habit which prevents savings, which continues unsafe operation, or stands in the way of improved apparatus or better service.

Just as soon as improved machinery is available, old standards are out of luck—they must go.

Now motors are no exception. There are economies and advantages in the electric drive, and—

There is now available a new induction motor—The Woods—which is particularly adapted to cotton mills, cotton gins, and other textile plants. It is semi-enclosed to reduce fire risk and cost of up-keep, yet is so perfectly ventilated, so clean, dry, and cool that output is not sacrificed, nor are heating limits raised.

This new motor is unique in its ventilating features.

The construction itself more than doubles the surface effective in radiating internal heat.

The direct ventilating system keeps the motor cool and the windings clean and dry by permitting no air to enter over bearings.

All air is screened at low velocity as it enters openings in the center of the frame; it flows through defined channels, and is mechanically discharged from the motor, passing over the dust-tight bearing housings. Thus all oil and dirt are expelled from the motor instead of being drawn into it as is the usual practice, and the screen is easily kept clean because free from dust and lint-soaked oil.

Although the Woods Induction Motor is a new product, it has been tried out thoroughly in mills and factories. It was designed after long experience in motor work, by men unhampered by existing construction.

You don't need a special motor—our standard motor will meet the conditions in your mill.

At space No. 219, International Textile Exposition, Boston, this motor will be exhibited, and the directive ventilating system demonstrated. Don't fail to see it between October 31 and November 5th. Mechanics Building, Space No. 219.

S. A. WOODS MACHINE CO.

(Motor Division)

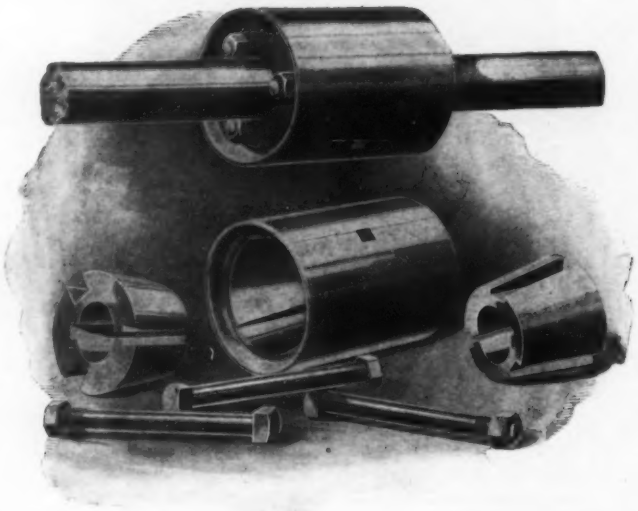
NEW YORK
CHICAGO

BOSTON, MASS., U. S. A.

NEW ORLEANS
NORFOLK

WOODS *General Purpose Induction Motors*

T. B. WOOD SONS CO.



Shafting Appliances
that Stand Up in Service

The Double Cone Compression Coupling

Is absolutely the strongest coupling of the compression type.

Correctly proportioned to transmit the full capacity of shafts it connects.

So designed that a slight variation in shaft sizes will be overcome and perfect alignment insured.

Finished so that all parts are concentric and their axes and that of the shaft coincide.

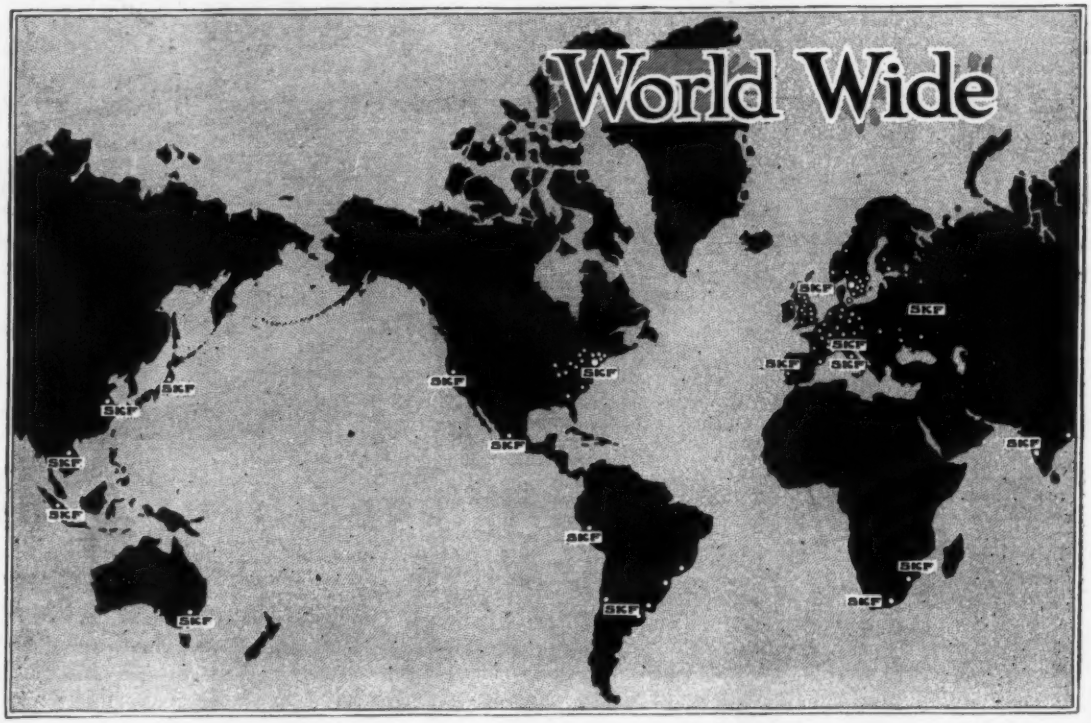
Right now is a good time to seek out the weak spots in your system of Line Shafting and let us co-operate with your engineers in making it strong and enduring.

T. B. Wood's Sons Company
Chambersburg, Penna.

Milton G. Smith, Southern Sales Agent, Greenville, S. C.

POWER TRANSMITTING MACHINERY

The technical knowledge that comes to you from SKF engineers is



as it is the sum of the data gathered by SKF organizations in all industrial countries.

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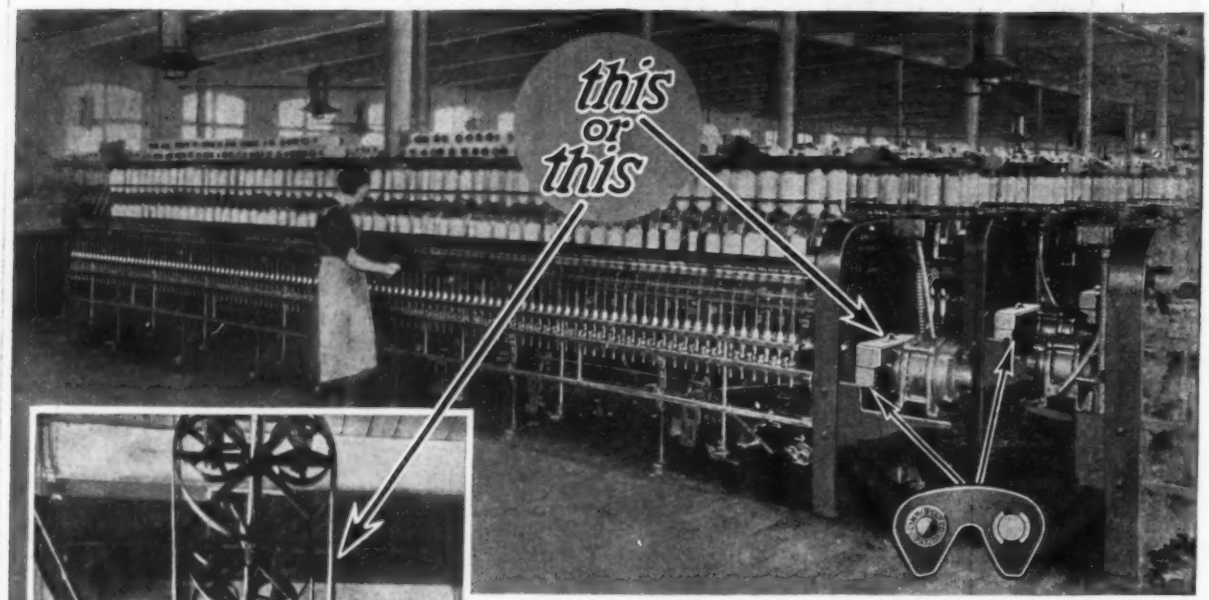

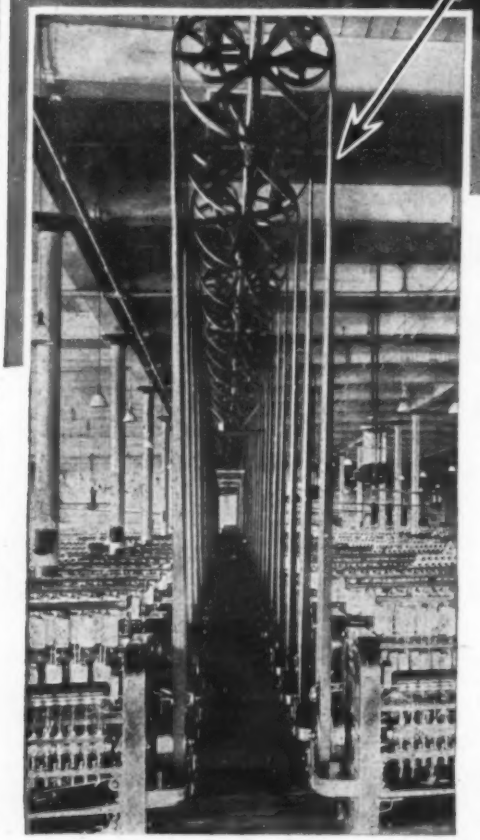

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THE elimination of belting, shafting, hangers, etc., made possible by the use of Link-Belt Silent Chain Drives, greatly improves the appearance of the mill, making it brighter, cleaner and safer.

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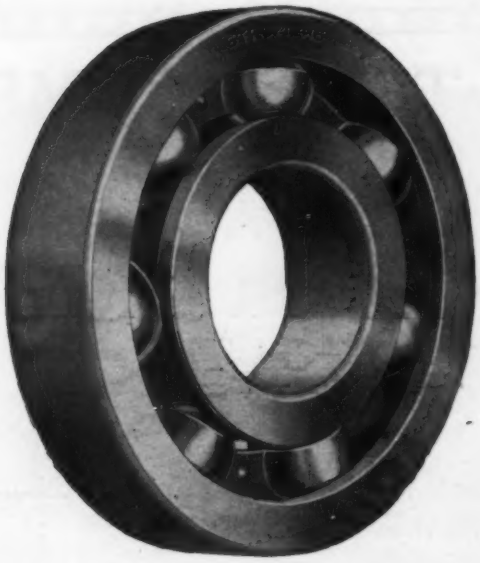

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How can you expect to maintain a lickerin setting to a thousandth of an inch if the shafts and boxes are worn several thousandths? Impossible, of course. Yet most lickerin bearings have some lost motion in them, and many are worn several hundredths of an inch so that correct settings cannot be maintained.

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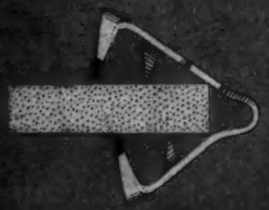

Double Staggered Teeth Insures Strong and Firm Grip

"Never Lets Go"

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In Time Saved — In Efficiency — In Durability

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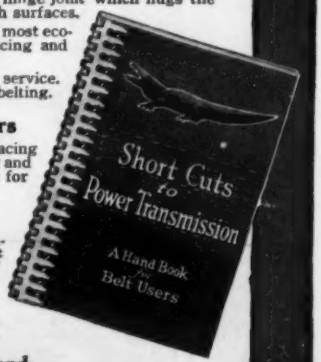

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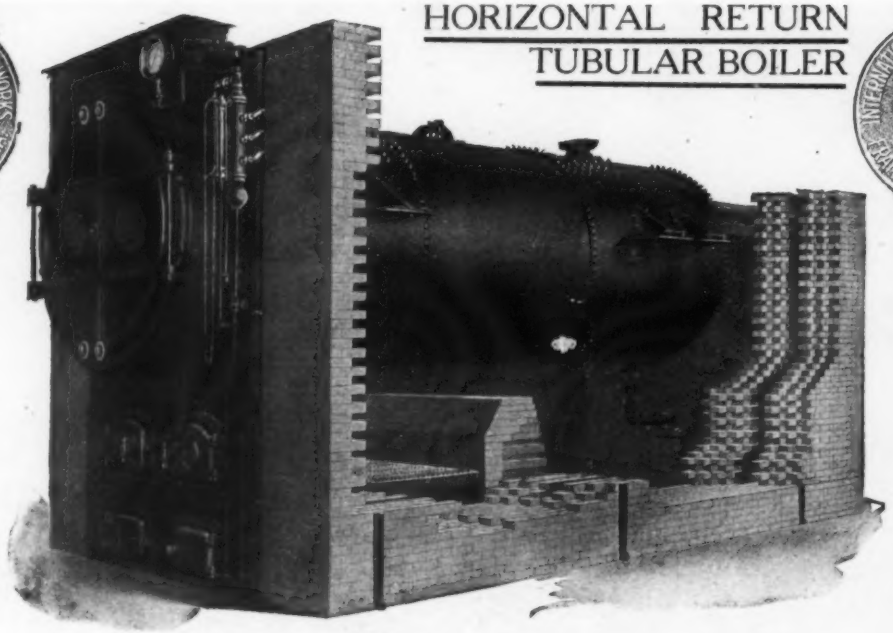

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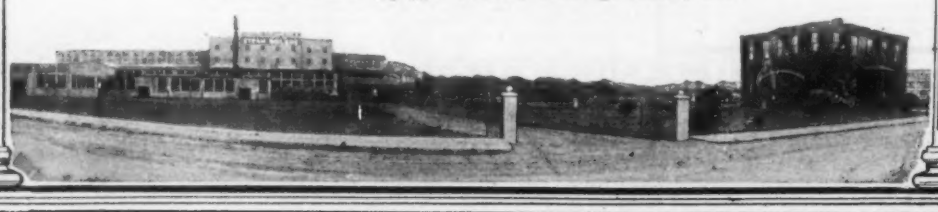

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To Help Industry Progress

Since the development of the first cotton mills in the South by far-sighted manufacturers, the number of spindles has grown from nothing to 15,951,076 on January 1, 1921.

This represents a growth of approximately 330% in twenty years in the cotton growing states.

Of this total, approximately 2,013,637 spindles are driven by individual motors on each frame. Approximately 7,415,000 are operated by group drives. The balance is operated by old type mechanical drives.

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This careful attention to all engineering advantages is reflected in the higher average output per spindle and the greater uniformity of product in modern textile mills.

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J. E. Sirrine & Company

Engineers

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Another book which may be of equal interest is "Factories for the Future"—along more general lines.

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"THE HARD SOFT WOOD."

For a **factory floor** where the wear is **hard**
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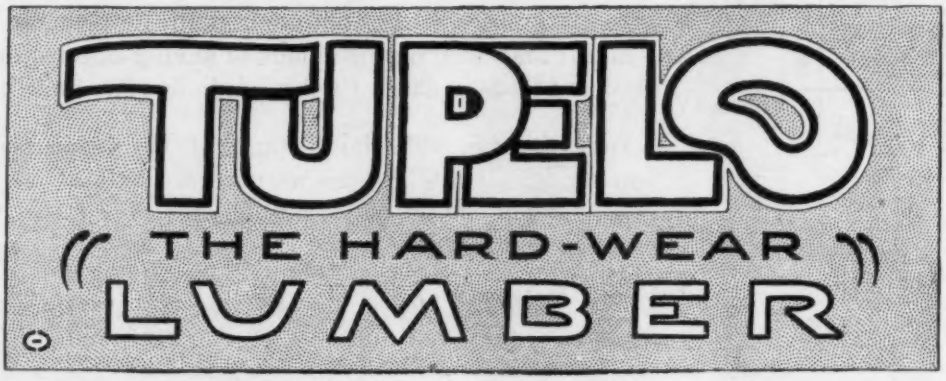
For a **warehouse floor** where the wear is **harder**
because of heavy loads coming and going—

For a **platform,** where the wear is **hardest**
with heavy truck wheels constantly rolling back and forth—



stands the gaff, because of its tough, closely "knitted" or "involved" grain, which prevents it from "slivering" or "kicking up."

TUPELO is good looking, too. Takes a fine finish.

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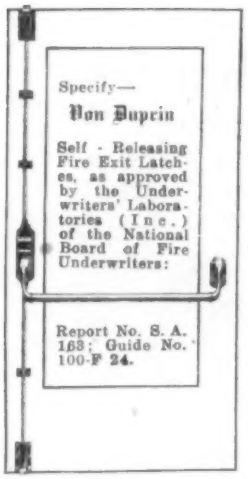
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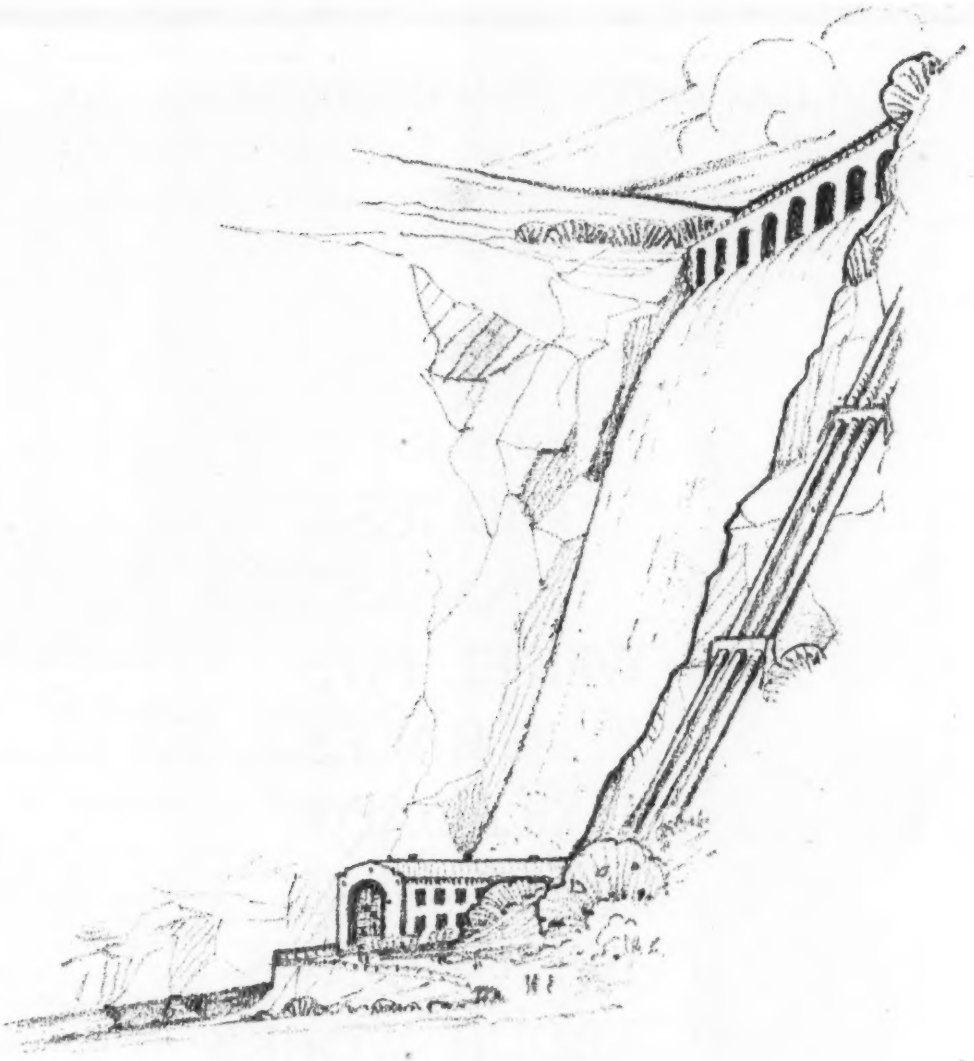

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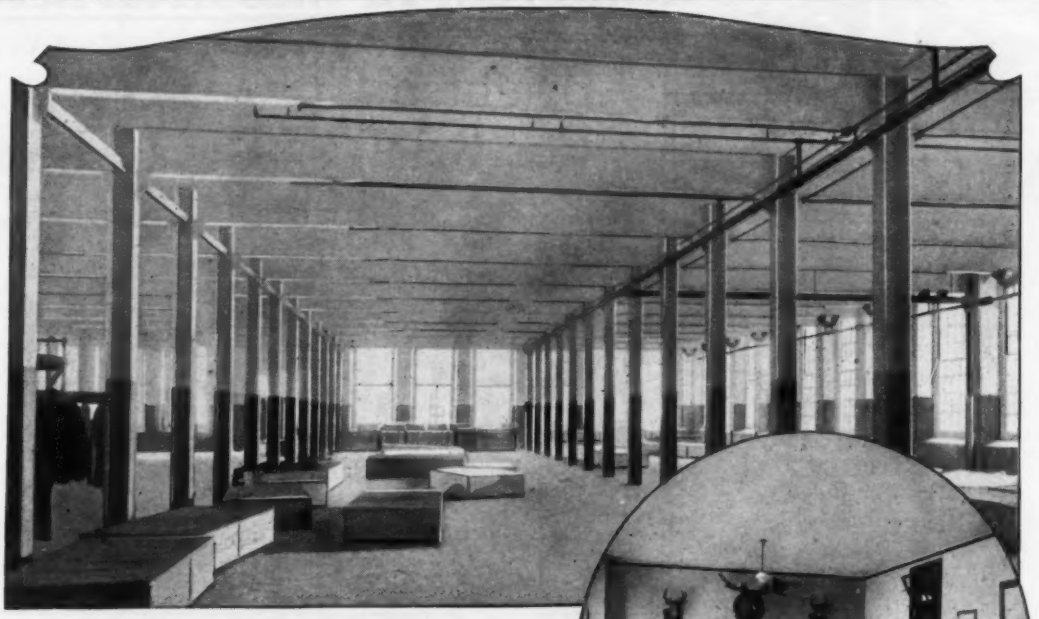

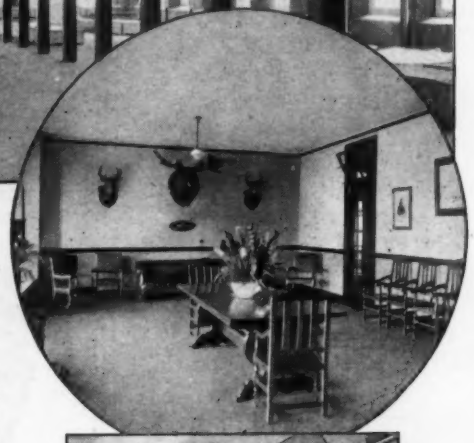

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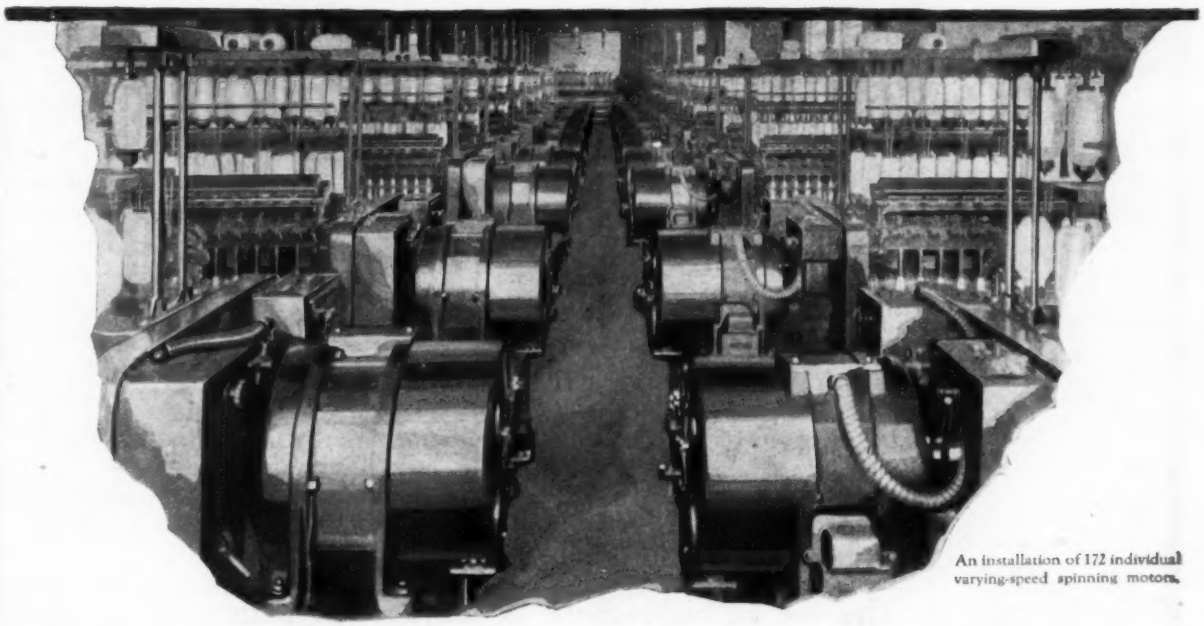
Paint Makers

The modern textile mill has found electrification essential to making a superior product and assigns an electric motor to each machine



An installation of 172 individual varying-speed spinning motors.

Where Delicate Work Requires Intelligent Power

Among the machines prominent in modern industry, and for which electric drive has especial advantages, is the loom. On it are produced an enormous variety of fabrics for utility, comfort and ornament, ranging from the heaviest ducks and carpets through woolen and worsted goods to the finest silks and laces.

After successfully supplanting the steam engine for ginning and bleaching processes, electric power has continued to advance step by step until today the machinery in a modern textile mill is nearly all run on the individual motor principle.

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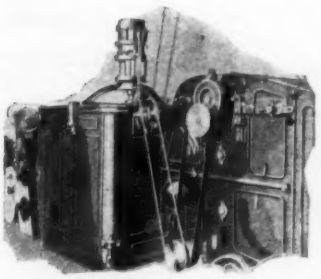
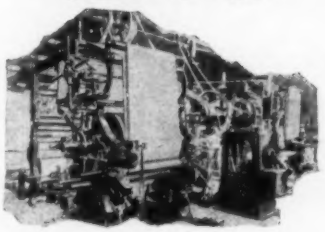
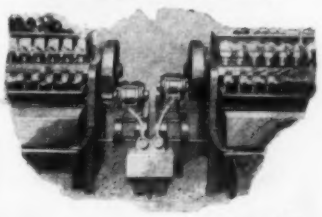


Vertical Picker Motor direct connected to Creighton Opener.



Brush-Shifting, Variable-Speed, 3-phase Motors driving cloth printing machine.



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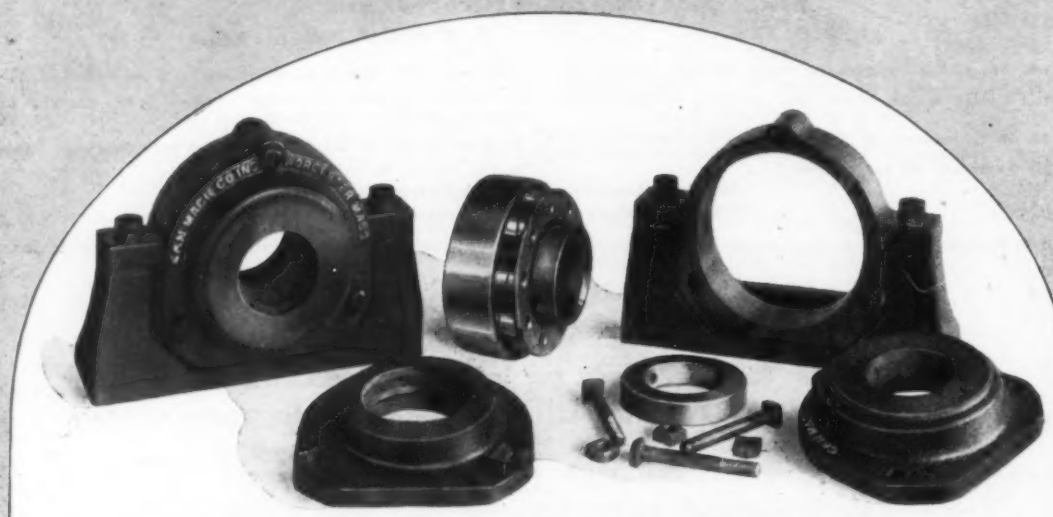


These Hyatt Beater Shaft Bearings Will Improve the Operation of Your Pickers

The use of these beater shaft replacement boxes is a simple economical method of equipping your pickers with Hyatt roller bearings.

The replacement boxes are interchangeable with present plain bearing boxes so that only a few simple operations are required to equip the beater shafts with Hyatt bearings—once equipped they will give years of service without bearing adjustment or replacement. They are automatically self-aligning and when necessary the beater shafts can be turned end for end without disassembling or re-alignment.

The shock loads incident to picker operation have no effect upon the sturdy chrome-vanadium rollers of the Hyatt bearing which will continue to run easily throughout the roughest kind of service. They maintain beater shafts in perfect alignment as there is no perceptible wear.

A Hyatt equipped picker requires lubrication only three or four times a year, because every drop of lubricant is held in the bearing housing where it belongs. The consequent reduction in lubrication (material and labor) is well worth while. The leak-proof bearings make for cleaner laps and freedom from oil stains.

In addition, Hyatt equipped pickers are easy running, thereby reducing the power necessary to operate, an important factor of production cost.

The beater shaft bearings and boxes cost about $30.00 per picker—this cost will be earned many times over during the life of the machine.

Specify that your new pickers be Hyatt equipped and modernize your present pickers by applying Hyatt replacement boxes. Complete information sent on request.

Hyatt Roller Bearing Company, New York, N. Y.

With the Publishers—

Today—The Day of Judgment

Judgment is a rare gift and is, perhaps, the executive's most priceless quality. Most men who possess it seem to have come by it naturally and then developed it by a wide experience of men and things.

It is the ability to compare and discriminate, to distinguish between the essential and the dispensable. It is the ability to know when to take a chance; when to buy and when to sell; when to increase and when to curtail production.

We encountered a situation recently which appeared to have been caused by the inability of someone to judge conditions and probable results correctly. We attempted to buy a small golf accessory and were told by the salesman that he would be unable to fill the order for ten weeks. The item in question is in greatest demand during the summer. It is made of iron.

We were puzzled to hear such news, for the iron and steel and allied and dependent industries have long complained that there was no market for their products. Now we find one of these dependent industries unable to supply its market when one actually exists.

What had happened? Investigating the cause of the shortage of the accessory, we learned that when the manufacturer should have been producing for his future demand, he "got scared" and curtailed production beyond all reason.

Then the demand he should have anticipated, and on which, in the light of his experience, he should have been willing to gamble, then that demand came and found him unprepared to meet it. Now his factory is working night and day trying to catch up—an almost impossible feat, for the demand will subside with the end of the summer. Then his stock room or his dealers' shelves will have to carry a heavy and expensive burden through the winter.

One more incident is worth relating, because it points out one of the dangers which every business must face in times of stress.

Concerns generally at the present time are spending a considerable proportion of their energy on sales. That seems to be an entirely reasonable thing to do. Yet, the owner of one business called in the general manager one morning several months ago and gave him orders to "fire every last salesman in the place."

The owner was going to "save money" by discharging all his salesmen, discontinuing all advertising—just when it was most necessary to *sell* his product with all the ingenuity and vigor at the command of the organization. Like the famous successful operation from which the patient died.

Yes, judgment is a rare and priceless quality. Incidents such as these seem but to emphasize its importance in management—and incidentally, the cost of poor judgment.

It calls to mind once more the tremendous responsibility that executives are called upon to carry by virtue of their positions as leaders and planners.

Both of the steps taken in the above cases were injurious rather than remedial. Negative action was taken in situations that demanded positive, aggressive action. No battle is ever won by waiting, faltering or retreating.

There is a good business lesson to be learned from the aggressive strategy of Marshal Foch. In July, 1918, things looked very dark for the Allies. They were still stunned from the fearful debacle of March and April. The enemy was flushed with success—his morale was high. Moreover, he was about to launch a last terrific offensive which, if it succeeded, would give him Paris and the Channel ports.

Did Foch falter? Did he "fire" his generals and stop ammunition and food from going forward? No! He gave the order to attack! In the darkest hour he struck. The enemy, all prepared to advance, was thrown into confusion and forced to retreat as best he could from Switzerland to the North Sea.

The result? From Chateau Thierry to victory in less than five months! Knowledge, courage, judgment—an irresistable trinity—made the unbelievable a reality.

Business men, wake up! Don't be bluffed by conditions. That does not say to ignore them. Face them with knowledge, courage and *judgment*. There is a way out—but not for a quitter. Others are winning. You can win! *From* 100%, *the Efficiency Magazine.*

Advertising

A lot of people in business think more about themselves than they do about their customers. They should recall the truism expressed by J. S. Vandeleer when he said:

"Just remember that the public doesn't care a tinker's darn about you, the condition of your exchequer, what jail you were in last, or whether you stutter or have a harelip. All it wants to know is what you have and what you want for it, and you must keep ever before them the name of your product and a reminder of its excellent quality."

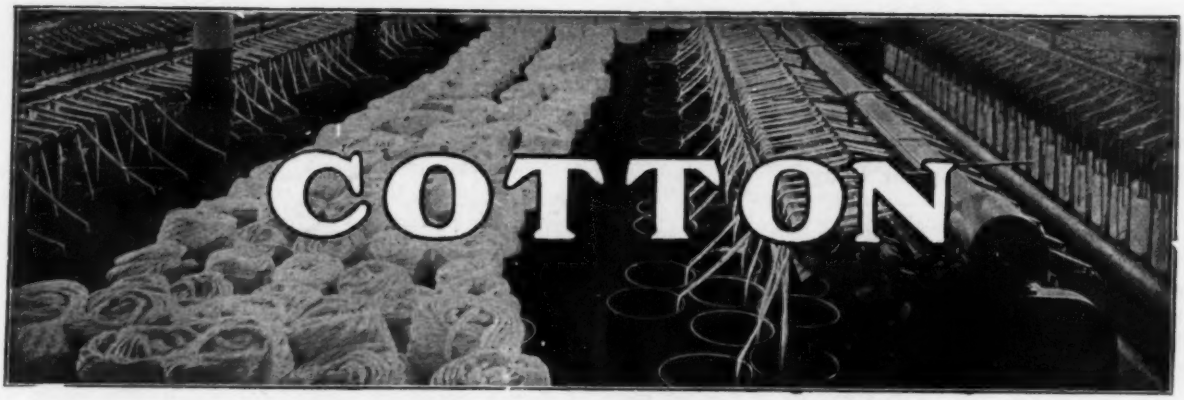
Advertising will make friends and customers, it will introduce, familiarize and often consummate the first sale, but the quality must be there if the customer is to become a repeater, and it is the repeater that pays the freight. Occasionally surprising results will be gained from the first advertisement, but in such a case the advertisement has been prepared with much cleverness, emphasis has been given to some unusual or outstanding selling point, and the position has been such as to make it appeal to the eye of the reader. More often than otherwise advertising has to be continuous and confidence built up. It is the establishment of confidence and good will which brings the stream of customers and repeaters, and it is clients of this character that make a business profitable.

AMONG COTTON'S READERS

L. H. BROWN,
Superintendent Brookside Mills,
Knoxville, Tenn.

"I consider the monthly journal COTTON the best measure of business and technical value that reaches my office; it is heaping full and running over with matter of vital interest to any executive connected with the textile industry.'

L. H. Brown



October, Nineteen-Twenty-One

Facts Are Stubborn Things.

Since certain labor union agitators have secured front page positions in the newspapers for some of their attacks on the living conditions among the southern cotton mills, considerable interest has been aroused throughout the country as to the truth or falsity of these assertions. While some of the questions asked by those interested indicate an entire lack of definite knowledge, the mere fact that such questions are being asked shows a feeling of doubt as to the truthfulness of the agitators' word pictures and a desire to know the real facts.

The preparation of some statistics in November of last year necessitated the sending of a questionnaire to the mills of the South, and for our own information a number of questions were added that had no bearing on the matter then desired. Some of the facts then obtained are apropos to the present discussion and are therefore presented herewith.

Of the 344 mills that replied to that questionnaire, 89 per cent have their own villages; 49 per cent their own schools; 19 per cent operate textile classes; 10 per cent have industrial Y. M. C. A.s; 14 per cent Y. W. C. A.s; 15 per cent have hospitals; 43 per cent have some sort of first aid arrangements; 9 per cent have lunch rooms or cafeterias; 29 per cent operate domestic science classes; 56 per cent have gardens; 27 per cent support brass bands; 63 per cent have baseball clubs; 24 per cent have motion picture theatres; and 27 per cent operate general stores.

Where the mill conducts the general store it is usually the practice to sell at prices below the other merchants in the nearby communities and in some instances necessities and staple goods are sold at cost.

During August of the present year more detailed figures on housing practices among the Georgia mills became available. Eighty of the 160 mills in the State are covered by this report and these mills in normal times employ 27,443 operatives of which 19,258 or 70 per cent live in houses owned by the mills. This percentage would be much greater if all the mills could have been included as many of the mills not included in this report are country or small town mills and practically all of these house their workers.

Of the 19,258 operatives under consideration, 1,726 have free rent; 188 pay 12½ cents per room per week; 1,052 pay 20 cents; 8,315 pay 25 cents; 145 pay 27½ cents; 2,791 pay 30 cents; 1,137 pay 35 cents; 1,070 pay 37½ cents; 890 pay 50 cents; 50 pay 55 cents; 125 pay 60 cents; 288 pay 75 cents; and 1,496 pay $1.00.

Considering the entire 27,443 workers, 3,246 or 11.8 per cent pay for water, while the other 24,197 or 88.2 per cent get their water free. Electric lights in the home are furnished without cost to 9,180 workers, while 18,263 pay for lights; 10.6 per cent have no garden space, while 89.4 per cent are provided with free garden space; free pasturage facilities for a cow is furnished 69.12 per cent, while 1.27 per cent pay 50 cents a month, 1.27 per cent pay $1.00 a month, 1.64 per cent pay $2.00 per season, and 26.7 per cent are furnished no pasturage.

In these days of high fuel costs, the question of winter coal is one that makes the householder groan. In this connection it is worthy of the notice of our friends, the general public, that 11,579 of these workers are furnished coal at actual cost to the mill; 1,650 get coal from the mill at $4.00 per ton; 205 at $5.00 a ton; 650 at $6.00 a ton; 435 at $6.50 a ton; 125 at $6.75 a ton; 875 at $7.00 a ton; 1,069 at $7.50 a ton; 740 at $8.00; 2,775 at $8.50; 1,470 at $9.00; and 108 at $10.00 a ton. The balance of these workers were supplied no coal. These prices are what was paid last winter. Just incidentally, Mr. General Public, what did you pay? Atlanta retail prices began at $9.25 in March, 1920, the low point of the year, and gradually increased to around $16.00.

Seventy of the 80 mills under discussion have made no change in rental rates for workers' homes since 1914; six have decreased rentals slightly; and four have increased rates about 12 per cent in the same period.

What was your experience with rents since 1914, Mr. General Public and Mr. Interested Questioner? Go out in your own town and ask the bank clerks and the salaried men what their experience has been. Also inquire if any union agitators have been around weeping buckets of tears over their condition, and if not, why not?

At least one mill furnishes its workers with unlimited telephone service for $1.00 a month. We pay $5.00 a month for a similar privilege here in Atlanta.

There are many other special privileges that might be mentioned, but to do so would be to single out special mills or groups of mills, which is not our purpose in this discussion. We merely wish to point to the general trend

in the relations between employers and employees in the cotton mills of the South.

Facts are stubborn things, as those who try to refute them frequently find to their dismay.

Back Up the Budget.

After a brief vacation, Congress is back at work again. It is difficult to say that the month which Congress spent away from Washington helped to expedite the nation's business. But it is just as likely that if Congress had stayed in Washington and fussed around in the tropical atmosphere of the Nation's capital, it would have tangled up more bills than it would have succeeded in enacting into law. Congress is pretty human after all and the congressmen tire just as easily as the rest of us.

It would be interesting to know also whether the Congressmen, as individuals, found that their little vacation was made up of unalloyed joy. For many of them who returned to their homes to look after their political fences found their constitutents bubbling over with question marks and demands for explanations of everything that Congress had done and had not done. For many of these, doubtless, it would have been an easier and a simpler task to stay in Washington and answer these questions by mail. But we will not know until a year from now how much the mortality rate of Congress has been increased or reduced by the fact that the Congressmen had an opportunity to visit their homes in the middle of a session.

At that, Congress has a busy fall and winter ahead of it. In fact it probably will sit in continuous session till next spring and deep into the summer until it finds a chance to go home again.

The chief accomplishment of the vacation period was the fact that it gave the Senate Finance Committee a chance to push the tax revision bill ahead of the tariff. The leaders in the House had given the tariff the right-of-way and, had Congress remained in session, might have made enough trouble for the Senators to keep the tariff in the van. But as soon as the rank and file of Congress had drifted away from Washington the Senate Finance Committee laid the tariff bill upon the shelf and began the task of rewriting the tax revision measure which the House had passed.

Under the Constitution both tax and tariff must originate in the House. But there is nothing in the Constitution that guarantees their inviolability against Senate amendments. And since the first tax bill was prepared by the first Congress the Senate has always exercised the right of this amending to the full. It is a wise Ways and Means Committee of the House that recognizes its own child after the Senate is through with it. So it is with the tax bill and so it will be with the tariff measure when the Senate has carved its initials in its long list of schedules. As a result of Senate changes, there will be plenty of delay in the House—for the House does not take kindly to the air of superior intelligence with which the Senate revises the efforts of the House.

Even now it is difficult to say when the nation is to be rewarded by the final enactment of either the tax or tariff bill. There are a lot of complications in such a measure. There are a lot of pitfalls, loopholes, and stumbling blocks —all manner of obstacles for the legislative parade. And both measures are continually being complicated by new developments in domestic and foreign affairs, by unemployment troubles, by financial stringencies, by industrial difficulties, by fluctuations in international exchange, by depressions and stimulations of foreign and domestic markets, by famines in Russia and crop shortages in Australia.

Even the disarmament conference which is to begin its labors next month will have vital and far-reaching effects on the tax and tariff troubles of Congress. For a stupendous portion of our tax bills is spent on armament and if the disarmament conference can reduce our military and naval budgets, Congress can indulge in an additional bit of tax retrenchment. For it has come to the point now where tax retrenchment depends entirely on tax expenditures. Tax repeals must be based upon a recession in appropriations.

That is where the new budget system is to demonstrate its efficiency. Director General Dawes has put in something like four months of work now carving and trimming and cutting and slashing and slicing and paring and hammering down the financial calls of the various items of governmental machinery. So far as he can control the final outgo, he has saved the nation and the nation's taxpayers many hundreds of millions of dollars.

But it takes more than the fiat of the Director General of the Budget to put these savings into actual fact. They must first be written into appropriation bills by Congress. That is where the difficulty will finally come. For many of the savings which the budget will indicate will be based on retrenchments that mean lessened salaries, smaller staffs, lower expenses, and often the abolition of entire bureaus. The individuals, the bureaus, and the communities that profit by these expenditures will not always accept them without complaint. Congress doubtless will receive many a vigorous protest against specific retrenchments. What is more important, Congressmen will hear from their constitutents much more vigorously when they seek to check the outgo of Uncle Sam's money to some pet project or to some influential individual than they will hear from the same constitutents in favor of retrenchments.

The winter session on appropriations will tell the story. When Director General Dawes took office in the summer there were plenty of prophecies that the days of the pork barrel bill were numbered and that Uncle Sam's expenditures would hereafter be bare of extravagance. But the appetite for pork barrel appropriations is as great as ever. The country is still full of people who see in Uncle Sam's treasury an inexhaustible reservoir of gold to be spent for their benefit. Budgets are wonderful things when they apply to other people's demands but their own pet projects must be fed no matter what it costs.

So the old fight will be on again. Extravagancies will be just as influential as ever. And it will take all the influence of President Harding and his administration to convert the budget economies into fact.

The foreman has long been known as the "key man in industry." He is the top sergeant of the working force. To the men he is both teacher and boss. To the management he is the channel through which all supervision flows. To both he is interpreter. He makes or breaks good will in labor relations and efficiency in production.

The Right to Work.

Governor Morrison of North Carolina should be congratulated for his very clear exposition of the attitude of the State authorities in relation to the recent cotton mill workers' strike in that state.

Speaking to the striking workers at Concord, he made it plain that he had no intention of trying to arbitrate the strike as that was an economic problem over which he had no authority; a problem that should and must be settled entirely by those involved. But he emphasized the fact that in sending troops into the strike district he was merely carrying out the idea that it is the duty of the State to afford protection to any workers who desire to work for their livelihood unmolested. This is good Americanism and should be commended.

When union labor gains control it is more than likely to be tyrannical and sometimes brutal. Evidence to this effect has blackened the headlines of newspapers for several years past. It is not a new tendency; it's an old dogma. An example will illustrate the point.

Twenty-six years ago, before the unions had reached their war-time strength, a young machinist from the populous East wandered into a well known Texas city in search of a job. Noting a sign announcing a shortage of machinists at a certain railroad shop and a desire to pay such machinists thirty-five cents an hour, this young machinist hastened to apply. After finding the shop foreman and stating his case, he was asked to produce his union card. He explained that he was not a union man, had never joined, but that he had served his apprenticeship in a certain large shop, and had acquired further experience in other shops; that he could handle any machine in the place and turn out satisfactory work thereon; and furthermore, they wanted men and he wanted a job as he was "broke" and hungry.

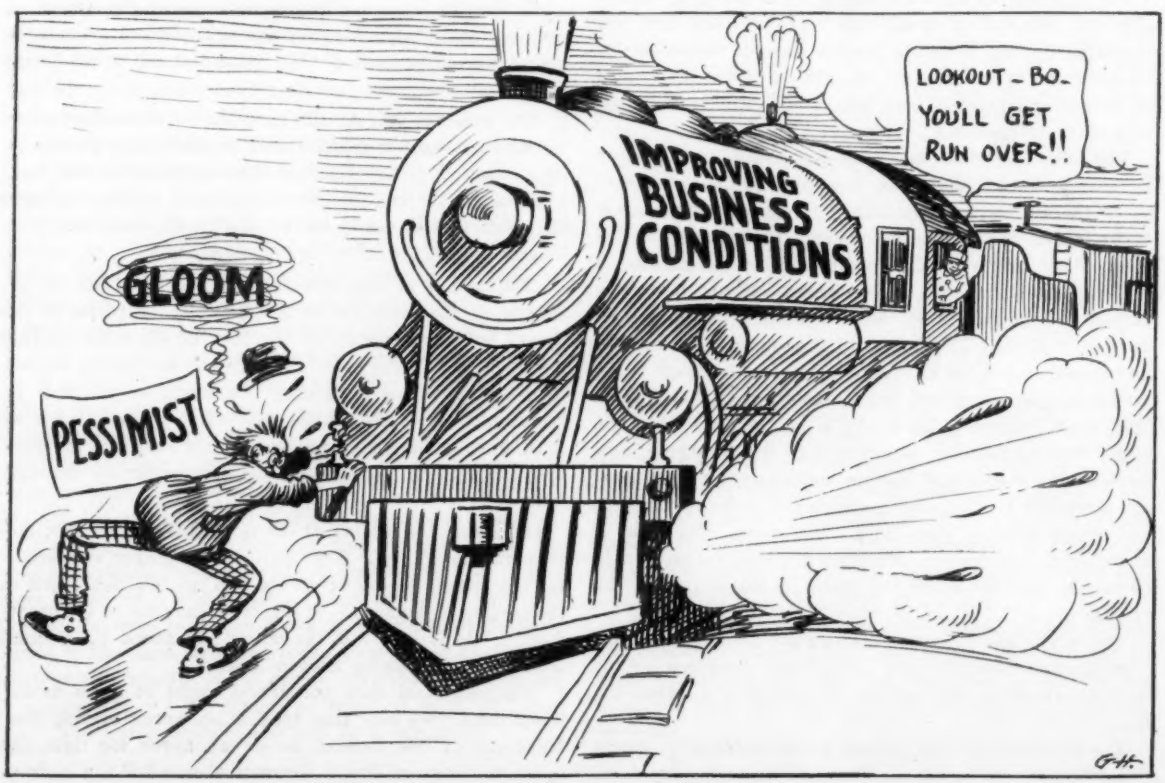
The foreman, one of that noted crew who later became "McAdoo's boys," smiled and replied that they didn't want any damned scabs in that shop. He admitted that they needed machinists, but if they couldn't get union men the work wouldn't be done. They didn't even want scab helpers, he added.

That's unionism. That's the closed shop. There was no labor disturbance. There was no strike. But that machinist couldn't get a job unless he stultified his Americanism and bowed his head in allegiance to such men as John J. O'Brien, who, twelve years later, announced to Philadelphia newspaper men that he "cracked his whip over one hundred and fifty thousand American workingmen."

North Carolina's law abiding citizens should thank God that they have a man at the head of their State government who believes in protecting the rights of the individual, not the least of which is his right to work.

From March 28th to May 11 there were seven cotton mill fires recorded by one insurance company that were caused by overheated bearings on looms. These fires occured in four mills located in the state of New Hampshire, Massachusetts and New Jersey. Suitable ball or roller bearings properly installed would not only prevent such frictional fires, but would also greatly reduce the power needed to operate the looms. Power means coal and coal means money these days.

The big winners are invariably men who have snatched success from the jaws of failure.—*Elbert Hubbard.*



The Mechanics and Practical Operation of the Perham and Davis Evener

BY S. A. FORD.

The recent discussion that has been carried on in COTTON over the picker question by the readers and the carding committee of the Southern Textile Association has brought to light many interesting points. The writer agrees with some and disagrees with others.

The object of the picking process is the production of a lap which shall be even in all respects both as to weight per unit of running length and per unit of width; shall be well cleaned of all foreign matter, that is, shall contain the least possible amount of such trash; and shall be made up of stock which has been well opened and aired and have the same density per unit of area. These are the qualities desired in a lap, always remembering that, in attaining the desired object, we shall treat the cotton in such a way that we will damage the fiber the least possible.

The process is what may be called purely mechanical. It may be divided into three separate and distinct operations; namely—feeding, cleaning, and lap forming. It is a process in which the finished product has the same form as the stock with which the machine is fed. But unlike other machines in the cotton manufacturing process whose product has the same form as the stock with which they are fed, (such as drawing and roving frames) the identity of the lap is completely lost during its passage through the picker and it becomes necessary to reform the stock into a lap. This point should never be lost sight of as it plays a prominent part in the discussion to follow.

The treatment of the stock during the breaking up of the tufts, the removal of sand, seed and leaf dirt and the amount of beating the stock receives are all controlled by the speed and type of beater, the setting of the beater and the setting and type of grid bars used, together with the force of the air current.

The formation of the lap is accomplished by that part of the machine known as the lap forming mechanism, consisting of the screens, calender and lap rolls. The formation of the lap on the screens is brought about wholly by the action of air currents. The construction of the machine is such that the surface of the top screen exposed to receive the cotton is much greater than the surface of the bottom screen so that fully 75 per cent of the cotton is drawn onto the top screen. It is at this point where the stock is reformed into a lap, where much damage may be done to what might otherwise be called a perfect lap. For no matter how perfect the laps fed may be, no matter how perfectly the evener and feeding mechanism may be working, unless the lap forming mechanism is working properly you cannot produce even laps. The secret of this is in remembering that the air current should draw the stock onto the screens and not allow the beater to throw it onto the screens.

The beater itself creates a certain air current which has a tendency to neutralize the air current generated by the fan. This must be overcome by the current of air from the fan.

The control of the fan current is accomplished by means of dampers placed in the air flues leading to the fan from the ends of the screens. It should be such that the stock should be evenly distributed over the screens and that all the stock should be drawn to the surface of the screens. By this I mean that none of the stock should be allowed to go down into the "bight" of the screens unless carried there on the surface of the screens. This will tend to reduce the chances of bunches or thick spots in the lap. If the amount of air leaving the screens is greater at one side than the other, then the lap will be heavier at that side because more air will carry more stock. If laps of such characteristic are made on the breaker they will have the same general characteristic from the finisher. While the lap forming mechanism of the intermediate and finisher will tend to remove this characteristic somewhat, they cannot entirely eradicate the defect and they receive no help from the evener for the evener tends to even only in regard to the weight per lineal yard.

The evener motion serves a very useful purpose but it has its limits and must be treated properly. Just because it is an evener it cannot be fed with any old kind of a lap and then be expected to produce even work in the fullest sense of the word.

The start of even yarn should begin back in the mixing room. The feeding of stock on the picking process is governed by the *density* of the stock, from the breaker picker with its automatic feeder, through the finisher with its evener motion.

By density I mean what might be called the weight of stock per cubic inch. By the term more dense I mean more weight per cubic inch or the same volume would weigh more.

The knocker off, on the automatic feeder attached to the breaker, removes surplus stock carried up by the elevating apron. It is set a certain distance from the elevating apron and will feed less weight per unit of time on light fluffy stock than would be the case if the stock was more dense.

The action of the evener motion is governed by the density of the stock fed to it. That is, the plates in the evener box are actuated by the bulk of the stock passing under them. If the stock runs uneven as regards density then the action of the evener plates will be uneven. It, therefore, follows that in the production of even yarns we must start at the mixing pile and so mix and open the stock that our final mixing shall be of the same density throughout.

It is with the feeding of the stock that the writer wishes to particularly deal. This part of the picker consists of the lap apron, the evener motion and the feed rolls. All of the feeding mechanism is driven from the cone on the evener motion. It is here that the writer has found his greatest trouble in overcoming uneven laps.

The causes of such unevenness might be listed as follows: slack cone belt, feed rolls or lap apron binding from being out of line, lack of oil or lap apron too tight, lap apron too loose causing a slippage when a full lap is drop-

ped onto the apron, feed rolls licking up causing sucking in, and an improper setting of the evener motion.

The evener motion was designed in such a way theoretically, that it should feed the same bulk or weight of stock per unit of time. If the laps fed the evener motion were always the same weight per running yard and always the same density, then, with the evener properly set the cone belt should never move from its position except as a lap runs out and its purpose would be only for that one reason as one writer recently suggested. But if this was the case it would only be necessary to have one evener plate extending the width of the evener box. This would necessitate only one pin connecting with the top lever and would do away with the system of compound levers now in use.

The designers, however, having due regard for the great chances of many holes, bunches, etc., which sometimes occur in the best regulated of pickers, conceived the idea of using many narrow plates (to be exact 16) which would be operated independently of each other and which would tend to overcome irregularities of small area. These sixteen plates were then connected by a series of compound levers to the major lever over the evener box and which governs the movement of the cone belt along the cones. Their theory was, in this manner, to speed up or slow down the feed rolls according as the stock entering was light or heavy. The more plates that drop the greater the effect would be on the major lever causing a greater movement of the cone belt. If one lap should run out, then all the plates would drop and the movement of the cone belt would be twice as much as if only eight plates had dropped. And with a fewer number of plates operating the result would be smaller in proportion.

But the effect of the evener motion is felt only in the length of the lap, not in its width, for if there be a heavy spot on one side of the lap fed and a light spot on the other side, as much lighter than the standard as the heavy spot is heavier, and both equal in area, then one will raise the same number of plates as much as the other will drop them. Then the heavy place will neutralize the light place and while the plates will drop and rise there will be no movement of the cone belt.

Such irregularities as this must be taken care of by the lap-forming mechanism, which, through the action of the air current, tends to distribute the stock evenly over the surface of the screens. The stock on the screens forms a blanket tending to interfere with the entrance of the air current and as the air will seek that course offering the least resistance, and will be stronger where the stock is the lightest, it will have a tendency to overcome such inequalities.

Theoretically, with the draft and evener motion properly set to produce certain weight laps it has always been considered that we might feed lighter laps and still get our standard weight. But this could not be done continuously and get the most even work possible. The evener would overcome such a difference provided it came at intervals so that the cone belt could regain its standard position. This is due to the fact that with conditions standard the cone belt should have a standard position and the major lever should have a standard adjustment, but if the position of the cone belt should change its standard position, due to lighter laps being fed continuously, then the adjustment of the fulcrum of the major lever should be changed to compensate for the change of standard cone belt position. The mathematics of this will be shown later.

With a perfectly operating lap-forming mechanism and the feeding mechanism working mechanically perfect, the evening properties of the cotton picker are obtained from two sources; namely, the doubling of the laps on the feed apron and through the action of the evener motion. Provided the laps on the feed apron are perfect there will be no work for the evener to perform, if four laps are always passing under the evener plates, and the cone belt will not move from its standard position.

But it is, of course, impossible, in the general run of conditions, to be sure that our breaker or intermediate laps will be perfect, so it is safe to say that the evening properties are derived from the two sources as named above.

To determine just how much evening comes from the doubling and how much through the action of the evener, the writer made some experiments, the results of which are shown in the following tables.

The stock was Strict Middling uplands of 1⅛ inch staple which had been thoroughly opened and mixed. The standard weight of the breaker laps was 13 oz. per running yard; that of the intermediate and finisher picker were 10 oz. per running yard respectively. The standard position of the cone belt was on a 4-inch cone diameter and the draft gears figured accordingly. One yard lengths of lap were weighed.

Table 1 shows the individual weights of one yard lengths from breaker, intermediate, and finisher with the cone belt held constantly on the 4-inch cone diameter which gives the evening properties of doubling only. In plugging the evener, care was taken to see that the adjusting screw on the major lever was backed off to allow the evener plates free play.

TABLE 1.

Without using evener motion.

Standard, 13 Oz. Breaker.	Standard, 10 Oz. Intermediate.	Standard, 10 Oz. Finisher.
12¼ oz.	9½ oz.	10½ oz.
12½ oz.	10¼ oz.	10½ oz.
12½ oz.	10¼ oz.	10¾ oz.
12½ oz.	9½ oz.	10¾ oz.
12½ oz.	10 oz.	10¾ oz.
12½ oz.	10 oz.	10¾ oz.
12¾ oz.	9¾ oz.	10¼ oz.
12¾ oz.	9¾ oz.	10¼ oz.
12¾ oz.	9¾ oz.	10¼ oz.
12¾ oz.	9¾ oz.	10¼ oz.
14 oz.	10½ oz.	10 oz.
16 oz.	10½ oz.	10 oz.
13⅝ oz.	10⅜ oz.	10 oz.
13⅝ oz.	10 oz.	10 oz.
12½ oz.	10⅜ oz.	10¼ oz.
13 oz.	10 oz.	10¼ oz.
13 oz.	9¾ oz.	10½ oz.
14½ oz.	9¾ oz.	10½ oz.
14½ oz.	10¼ oz.	10½ oz.
14 oz.	10¼ oz.	10½ oz.
14 oz.	10¼ oz.	10 oz.
14 oz.	10¼ oz.	10¼ oz.
12 oz.	9¾ oz.	10¼ oz.
13½ oz.	9¾ oz.	10 oz.
Total = 318 oz.	Total = 241 oz.	Total = 248 oz.
Average = 12¼ oz.	Average = 10.04 oz.	Average = 10.33 oz.
Heaviest = 16 oz.	Heaviest = 10.75 oz.	Heaviest = 10.75 oz.
Lightest = 12 oz.	Lightest = 9.58 oz.	Lightest = 10.00 oz.
% Variation = 30.1 %	% Variation = 12.4%	% Variation = 7.2%

These tests showed that with pickers operating as perfectly as possible, without the use of an evener on the intermediate and finisher, a finisher lap was made which showed a variation of 7.2 per cent in the weight of one yard lengths.

When tests were made using the evener motion the cone belt was run on a 4-inch diameter and the laps fed the intermediate were the same as those used in the first test so that in each case the laps from the breaker varied 30.1 per cent.

TABLE 2.

Using evener motion.

Standard. 10 Oz. Intermediate.	Standard. 10 Oz. Finisher.
9¾ oz.	10¼ oz.
9¾ oz.	10½ oz.
10¼ oz.	10¼ oz.
10¼ oz.	10½ oz.
10¼ oz.	10½ oz.
10¼ oz.	10½ oz.
9¾ oz.	10½ oz.
9¾ oz.	10½ oz.
10 oz.	10½ oz.
9¾ oz.	10½ oz.
9¾ oz.	10½ oz.
10 oz.	10½ oz.
9¾ oz.	10½ oz.
9¾ oz.	10½ oz.
10 oz.	10¼ oz.
10 oz.	10¼ oz.
10 oz.	10½ oz.
10 oz.	10½ oz.
9½ oz.	10¼ oz.
9½ oz.	10¼ oz.
9¾ oz.	10¼ oz.
9¾ oz.	10¼ oz.
9¾ oz.	10½ oz.
9¾ oz.	10½ oz.
Total = 237.0 oz.	Total = 250.0 oz.
Average = 9.875 oz.	Average = 10.41 oz.
Heaviest = 10.25 oz.	Heaviest = 10.50 oz.
Lightest = 9.50 oz.	Lightest = 10.25 oz.
% Variation = 7.6%	% Variation = 2.4%

The results of the test where the evener was used showed that the finisher lap had a variation of only 2.4 per cent where a variation of 7.2 per cent was found when the evener was not used.

This would seem to indicate that the evener motion does serve some useful purpose at times other than when a lap runs out.

The sketch shows a diagram of the Perham and Davis evener as applied to a Kitson picker.

The feed and evener box rolls are driven from the cone at a speed which is governed by the speed of the cone which in turn is governed by the position of the cone belt on the cones. Through the cone belt rack, the quadrant and connecting lever D the position of the cone belt is controlled by the major lever which in turn is raised or lowered by the plates in the evener box acting through the series of compound levers.

The evener plates are operated by the mass or density of the stock passing under them and through the levers and gears acting as levers, they cause the cone belt to be moved along the cone, thereby increasing or decreasing the speed of the feed rolls to compensate for a light or heavy feed.

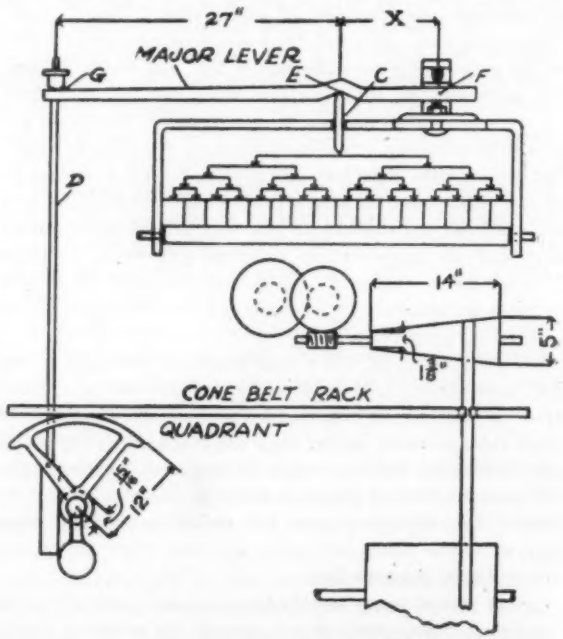
Thus the action of the evener causes an alteration of the draft according to the weight fed. It, therefore, follows that with present machinery and conditions it would be impossible to have a constantly driven feed roll whose speed would never change.

The distance the cone belt moves along the cone is controlled by two things—namely the rise or fall of the evener plates and the position of the fulcrum F. The greater the rise or fall of the evener plates the longer the movement of the cone belt. The greater the distance X, or the distance from E to F, the less the movement of the cone belt.

With the same weight laps fed under the evener plates there will always be the same drop of the connecting pin C. when one lap runs out. This will cause the major lever to drop the same amount at the point E. The drop at the point G, however, is the thing which determines the amount the cone belt shall move and this is controlled by the distance from E to F as well as the drop at the point E. So it is possible to have the point E drop a certain amount and then have G drop more or less according as the distance X is less or more. The closer F is to E the more the point G will drop with the same drop at E.

The proper setting of F is at such a point, that, when C drops, owing to one lap running out, the point G will drop an amount sufficient to cause the cone belt to be moved to such diameter as will feed the three laps remaining at a rate high enough to compensate for the loss of the lap which ran out.

But first it must be determined what shall be the standard position of the cone belt. Most every overseer has his own idea where the cone belt shall run when feeding the full quota of laps. Some prefer running the cone belt on the middle of the cone and some prefer running it on a four inch diameter and others have a different idea as to where its standard position should be. But there is one thing that all will agree on and that is, *it must not slip.* This point must be looked after and it is most certain that the



larger the diameter the cone belt runs on, the less is the liability of its slipping. A four-inch cone diameter is about the limit, however, and the writer feels that best results are obtained at this point.

But if the cone belt is not slipping, it really does not make much difference where it is run within limits, provided the fulcrum F is properly set. But if the cone belt is run on a three-inch diameter, F should be set differently than when the cone belt is run on a four-inch diameter.

For example: The cone driving the feed rolls is 14 inches long. Its small diameter is 1⅜ inches and its large diameter is 5 inches. This being a straight-faced cone, it increases in diameter the same amount for each inch in length. Then 5 in. — 1.375 in. = 3.625 in. = total increase in cone diameter. This increase of cone diameter takes place in the length of the cone, or 14 inches. Then the increase in diameter for each inch of length must be 1/14 × 3.625 = .25875 inches. This means that any two points one inch apart on the cone will show a difference in diameter of .25875 inches.

Let us suppose the cone belt to be running on a 4-inch

diameter with four laps feeding. When one lap runs out only three are feeding and the rate of feed for three must be four-thirds as fast as the rate of feed for four to keep the same amount feeding at all times. This would call for the cone belt to be moved to a position with a diameter three-quarters as large as the original because the cone being driven it would call for a reduction in diameter to increase its speed. Then the diameter on which the cone belt should run when only three laps are fed should be three-quarters of 4 or 3 inches. This mean the cone belt should move a distance sufficient to cause a reduction of one inch in cone diameter. As the cone diameter reduces .25875 inches for each inch in length, the cone belt movement must be an amount equal to 1 divided by .25875 inches.

$$1 \div .25875 = 3.86 \text{ inches.}$$

That is, the cone belt must move a distance of 3.86 inches horizontally to cause it to move from a 4-inch to a three-inch diameter.

Now in making the tests shown in Tables 1 and 2 the writer further tested the density of the 13.25 oz. breaker lap by running each of the four laps fed one at a time under the evener plates and measuring the rise of the pin C.

Each of the four laps fed raised the pin C 1/16-inch and when one lap was taken out the pin C dropped 1/16 inch. So for a 13¼ oz. lap the pin C was raised 1/16 inch for each lap added and dropped 1/16 inch when one lap ran out. We have seen that the cone belt must travel 3.86 inches when one lap runs out and that the point E on the major lever drops 1/16 inch when one lap runs out. So the distance E to F, or X, must be such that with 1/16-inch drop at E, G will drop enough to allow the cone belt to move 3.86 inches toward the small end of the cone.

The quadrant meshing with the cone belt rack has a pitch line radius of 12 inches which has the same effect as a lever 12 inches long. The small pinion gear carried on the hub of the quadrant and meshing into the rack on the rod D has a pitch line radius of 15/16 inch which has the same effect as a lever 15/16 inch long.

With the quadrant on a leverage of 12 inches moving 3.86 inches the rack on D through a leverage of 15/16 inch will have a drop as expressed in the following proportion.

$$12 : 15/16 = 3.86 : D$$
$$D = (3.86 \times 15/16) \div 12$$
$$D = .301 \text{ inch.}$$

Then the rod D and also the point G will have to drop .301 inch to have the cone belt move 3.86 inches.

The distance X is next found by the following method: The point E has a drop of 1/16 inch due to one lap running out. The point G must drop .301 inch to move the cone belt from a four- to a three-inch diameter. Then the distance X will be found by the following equation:

$$(27 + X) : X = .301 : .0625 \text{ or } 1/16 \text{ inch.}$$
$$X = 7.07 \text{ inches.}$$

Therefore the distance E to F must be 7 inches if the loss of one lap causes the point E on the major lever to drop 1/16 inch when the cone belt has a standard position on a 4-inch cone diameter.

As stated before many prefer to run their cone belt about center of the cone. Let us say that this would be on a 3-inch diameter. All other conditions would remain the same. The only change over the previous conditions is that the standard position of the cone belt shall be on a 3-inch cone diameter instead of a 4-inch cone diameter.

The loss of one lap will mean feeding three laps at four-thirds the speed of four laps, and will mean moving the cone belt to a diameter ¾ as large as when four laps are fed.

$$3/4 \times 3 = 9/4 = 2¼$$

Therefore, the diameter when three laps are feeding must be 2¼ inches or a difference of .75 inch less than what the diameter was when four laps were feeding.

As each inch of cone belt traverse reduces the diameter .25875 inch, then the number of inches the cone belt must travel to change from a 3-inch to 2¼-inch diameter will equal $.75 \div .25875 = 2.89$ inches.

Then D will drop an amount as shown in the following equation:

$$12 : 15/16 = 2.89 : D$$
$$D = (2.89 \times 15/16) \div 12$$
$$D = .225.$$

The distance X would be found by following equation:

$$(27 + X) : X = .225 : .0625$$
$$X = 10.3 \text{ inches.}$$

This means that in running a 13¼ oz. breaker lap on the intermediate, doubling four, I found that the loss of one lap would cause the pin C to drop 1/16 inch. When the standard position of the cone belt was on 4-inch diameter the setting of the fulcrum of the major lever, or distance E to F, should be 7.07 inches to cause the cone belt to move from 4 inches to 3 inches diameter to compensate for the loss of one lap.

When the standard position of the cone belt is on a 3-inch diameter, other conditions remaining the same, then the distance E to F should be 10.3 inches to cause the cone belt to move from a 3-inch diameter to a 2¼-inch diameter to compensate for the loss of one lap.

It is all right and possible to run the cone belt anywhere for a standard position but the setting of the fulcrum of the major lever must be considered if the lever is to work as it should.

The point brought up by another contributor relative to the evener being an instrument for locking the barn after the horse was stolen, is something that a first examination would show to be possible. But this is not so.

In the first place the evener itself is not instantaneous in its action but there is a slight loss of time between the drop of the evener plates and the time the cone belt reaches its new position. During this time the lap is passing on to the feed rolls and by the time the belt reaches its new position the lighter weight feeding, has reached much nearer the feed rolls than 3 inches.

And by far the greatest factor against such a thing happening is the action of the lap forming mechanism. As the lap forms on the screens, if care is taken to watch it, the stock leaving the beater is generally deposited on the screens at the exposed part furtherest from the "bight" of the screens. This allows the maximum time possible for the effect of the evener to reach the screen. And the action of the air current is such that it tends to draw the same bulk of stock to all parts of the screen.

The foregoing explanation applies only to the Perham and Davis evener, but the general ideas as expressed will apply to any evener.

Supply Storing and Distribution

BY R. W. PHILIP.

A stock room or repair parts department is a necessary adjunct to every cotton mill. The size of this stock room and the amount and value of the supplies to be kept on hand will, of course, vary with the size of the mill itself. Yet, it is most important that, whether large or small, the stock room should be operated on the most efficient plan possible, for the repair parts that it is necessary to keep on hand will always be of considerable value, and will often represent a surprisingly large investment.

To be of the best service to a mill, and to give the maximum return on itself, a stock room should be operated as more than a mere means for storing supplies and dispensing these to the different departments. It has further valuable possibilities.

When conducted under a proper system, a stock room can be more than a stock room. It can serve as a medium for determining the proportionate part of the total repair and supply cost that each department is absorbing, and thereby costly leaks and wastes and unnecessary use in supply parts can often be traced to the real source, and frequently such useless expense can be eliminated by proper correction, rather than charging off the total expense to the plant as a whole, which has proved an unjust practice.

Every mill, of course, has in operation some method of disbursing repair parts and supplies to the different departments. However, in the following paragraphs are presented some suggestions which, possibly, might be adapted in part, for the efficient and economical operation of a mill stock room. The system outlined is adapted from a system now in practical use and not only provides a means for keeping sufficient supplies for the plant without a costly surplus, but it is also a convenient aid in keeping a check on expenditures for supplies, furnishing a ready analysis showing just what each department of the mill is spending for repairs and supplies.

In this system the boxes or bins are arranged in rows and are indicated by numerical numbering. The bins can of course be constructed in any sizes convenient for receiving any particular size or shape of supplies and parts, if they are to be constructed of wood, while the use of flexible steel shelving, to be treated later, offers a more convenient means for providing for the various items. The arrangement of these bins, the height of the sections, etc., will naturally be dependent upon the local desires and requirements.

The blank shown in Figure 1 is a requisition slip, measuring 3½ by 5½ inches, which is furnished to the overseers of the different departments in pads of, say, 100, all overseers using the same style of slip. When repair parts or supplies are required, the overseer or his second hand fills out one of these blanks for the required amount of parts, signs it, fills in the room and section for which the supplies are desired in the places provided for that purpose, and sends it to the stock room.

The form used in the stock room to keep a record of the location of the supplies in the bins, their cost, etc., is reproduced in Figure 2. Also on this form is kept a perpetual inventory which shows at a glance the number of a certain repair or supply part on hand. When a consignment of supplies is received, record is made on this form, which is kept in a loose-leaf book, the date the supplies are received and the number of pieces received being indicated in the respective columns provided for this purpose. Another popular and convenient practice is to have a card index method instead of the loose-leaf record book. The accessibility and convenience of this plan recommend it.

REQUISITION FOR SUPPLIES

PLEASE FURNISH THE FOLLOWING DATE 192

QUANTITY	DESCRIPTION	PRICE	TOTAL

SECTION No.

ROOM OVERSEER.

FIG. 1. THE REQUISITION BLANK.

When an order comes in from an overseer, the stock room man looks in his loose-leaf book to find the location of the supplies desired. In the case of castings, these

CASTING NO. BOX NO. SHOP PRICE FOUNDRY PRICE WEIGHT

LBS

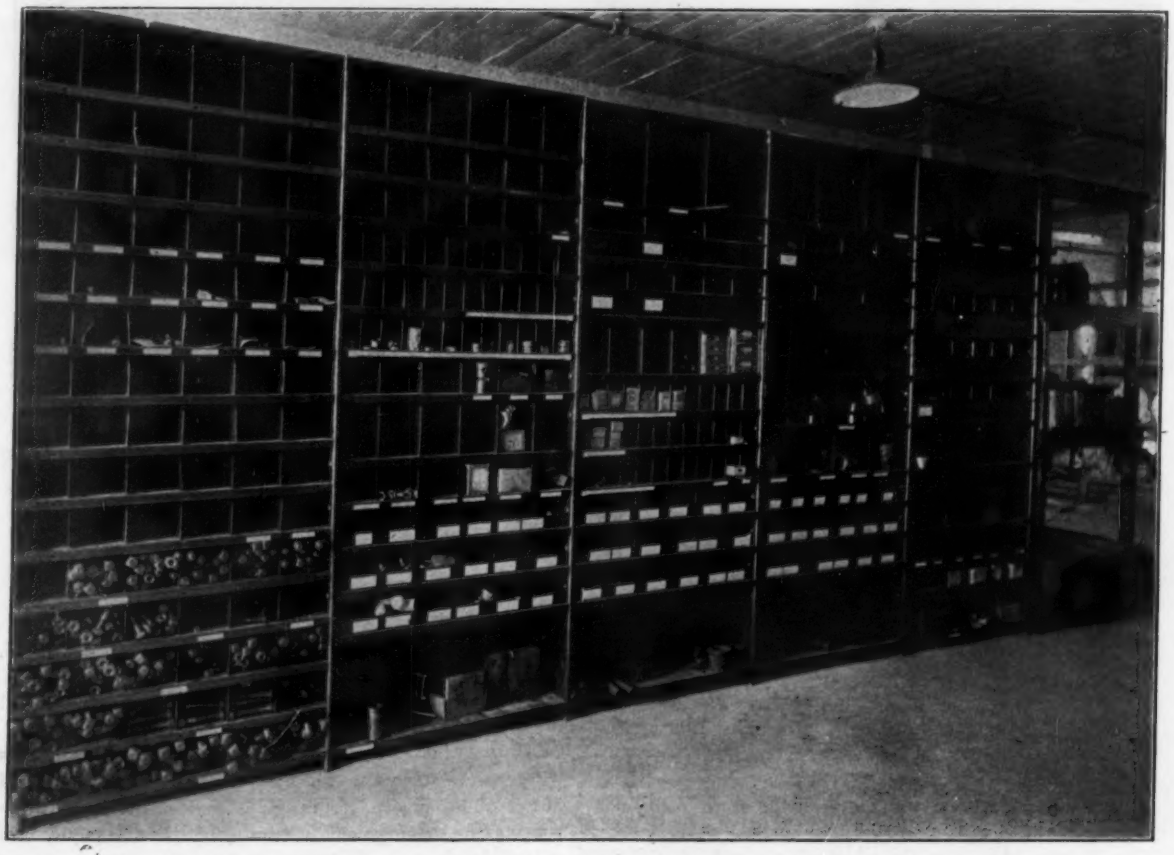
	DATE	STOCK ON HAND	No PCS.	DATE	STOCK USED	No PCS

FIG. 2. THE LOOSE-LEAF RECORD SHEET. SIZE 8⅜ x 10⅞ REVERSE SIDE OF SHEET IS A DUPLICATE OF THE SIDE SHOWN.

are usually recorded on the line marked "Casting No.," and these may be indicated by the series of numbers given the respective castings by the different manufacturers. With general supplies, however, the name is substituted for the number.

The number of the bin in which the desired parts are located will be found under "Box No.," and if the bins are arranged in sections of, say, 100 it will be much easier for the supply man to locate a particular bin or box.

When the parts have been located and the order filled, the stock room man next finds the unit cost of the articles under "Shop Price." He indicates the cost of the order on the requisition slip, and the slip is placed on a file on the stock room man's desk. As a record for the stock room he places on the form (Fig. 2) in the loose-leaf record book in the column "Stock Used" a series of pencil marks equaling in number the number of parts delivered.



SECTION OF STEEL SHELVING IN THE TUPELO (MISS.) COTTON MILLS STOCK ROOM.

At the end of every week, these used requisition slips are removed by the stores keeper and separated according to the room and section from which the requisition was issued. Then the total amount of the requisitions from each room is found (the cost having been previously indicated on the slip at the time the order was filled), and each overseer is furnished with a report of the cost of supplies used in his department during the week. This is supplied in sections, so that the department head can easily ascertain just the amount and value of supplies that were used by each section. By having this information, he can figure the average cost per section, or per machine if desired, and having the cost by sections, he can find out which section or sections have used the largest amount of supplies. He can then take the matter up with that particular section man or loom fixer and find out the exact reason for the excessive use of supplies and then follow it up with corrective measures.

Also, the overseer can see what sections are using supplies below the average for the room. This will offer an excellent opportunity for cutting down on the total amount of supplies used in the whole room; this may be accomplished in various ways. The overseer might procure some banners which could be displayed by the section operating for the past week on the least number of supplies. One South Carolina mill has found that the amount of supplies used can be reduced by conducting a prize contest and offering a small prize to the section or the operative who uses the smallest amount of supplies and repair parts within a stated period. Such things as these instill in the workers a spirit of friendly rivalry, and at the same time the results will show in the cost sheets of the different departments.

Furthermore, with this system, all requisition slips can be returned to the respective overseers by whom they were originally issued, together with this report, at the end of every week, so that the department head can satisfy himself that there has been no error made in calculating the cost of the respective sections, as the section for which any particular supplies were ordered is indicated on each slip.

Stock room inventory is taken every three months under this system, and is a very simple matter. The stock room keeper simply goes to his loose-leaf record of parts received and delivered, and by subtracting the number of pencil marks indicating the number of parts issued from the number which he has received, he can get the number of parts actually on hand at the time of inventory. Then if this supply seems to be low, he can order additional supplies or parts.

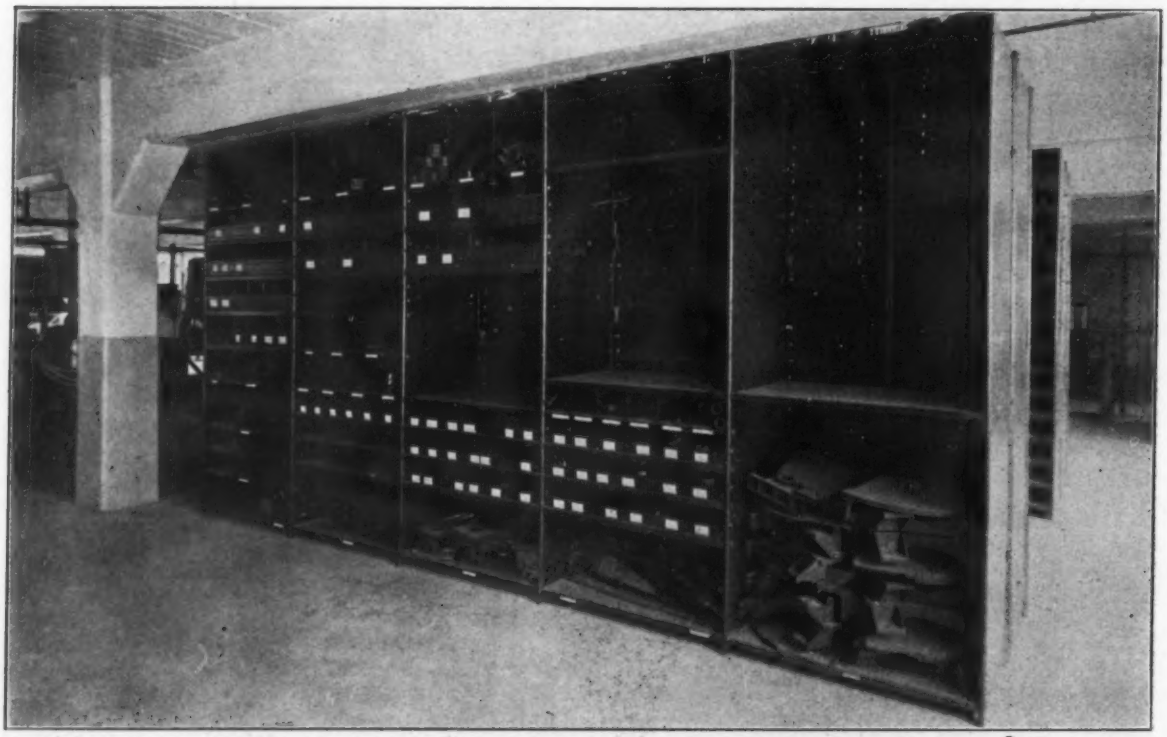
The matter of just about how many units of each particular repair part or supply to keep in stock can, of course, be best determined by experience. However, by recording on the form (Fig. 2) the date when parts or supplies are issued on requisition, it will, after a short time, be easy to determine the approximate number of units consumed within a certain time.

In making an order for supplies, the stock room man uses the regular requisition slip used by the overseers (Fig. 1) and turns this in to the purchasing agent of the mill. When the supplies are received, he signs the drayage ticket and enters the number of supplies received in the loose-leaf record, places the parts in the correct bin, and no more work is necessary on his part until a requisition for these particular parts is received.

If it is desired that the stock room man have a record of the parts he has ordered for the supply room, he may have his order blanks numbered consecutively and keep a carbon copy of each order. This copy is filed in a suitable box containing index cards numbered from 1 to 31, at a point approximately 7 days after the date of the order. If the goods have not been received by that time, they may be traced by the order number on the slip.

As will be seen, this system is very simple and efficient, and its beauty lies in the fact that it practically eliminates burdensome clerical work on the part of the man in charge of the stock room. The only clerical work necessary is the adding up of the costs of the different sections at each week-end, recording the receipt and disbursement of supplies, and indicating the cost on the requisition slips.

It is of course understood that in the arrangement of the bins in the room, those containing parts which are in most frequent demand are placed in the easiest accessible locations, while the boxes in which are placed those parts which are very seldom ordered are arranged in the locations more difficult of access. Also, the heavier and more cumbersome supplies and parts should be so located that they may be delivered without excessive trouble.



BEYOND THE SECTIONS OF STEEL SHELVES AT THE EXTREME RIGHT MAY BE SEEN THE WOVEN WIRE PARTITION THAT SURROUNDS THE STORE ROOM.

However, in a stock room of this type, it is advantageous to segregate the parts for the different departments and makes of machinery, insofar as is convenient, without disrupting the arrangement just outlined. For example, in a mill containing a much larger number of one make of loom than of other types, thereby increasing the number of parts which must be carried on hand for this type of loom, it is found advisable to keep these parts in the larger division of the stock room where the bins of general supplies are located, and which is nearer the delivery window, while the parts for the looms of which there is a much smaller number are kept in a separate division. The card repair parts and supplies are to be kept in another division, and so on. However, the numerical labeling of the bins in all of these divisions obtains throughout, so that duplicated numbers and more complicated methods are made unnecessary.

The foregoing practically covers the system as it works as a whole, and when properly operated, it should serve to carry on the dispensing of supplies to the different depart-

ments of the mill without friction, and also offer a check on the cost of the supplies used by each department. There are, of course, other supplies which are handled through the stock room about which no mention has been made, and in the next few paragraphs the methods used at this mill in handling some of these will be outlined, with the idea that they may be of some service to other mills.

In the case of shuttles, every new shuttle that is issued from the stock room is marked with the date on which it is delivered to the loom fixer. Then, when this shuttle is returned as broken, the stock room man can tell at a glance just how long it has been in use, and if it seems that the time of its service has been too short, he turns the shuttle over to the overseer in charge of that particular room, who can trace the loom on which it was used, and find out just why the shuttle did not live an average life. If the loom is at fault, then it can be corrected, and if not, the loom fixer or section man may have to do some explaining.

It might be mentioned here that when an order for new parts is sent in, it is a rule that the old or broken parts corresponding to the ones ordered must accompany the requisition. When it is possible to do so, these broken parts are welded and repaired and re-issued on requisition.

Belting is kept in a rack in one corner of the stock room, and when a new piece of belt is needed, the old piece is brought in, laid down on the floor in a straight line, and a new section drawn off the roll equal in length to the old piece, so that there will be no mistake as to the length. The rolls of belting are supported on pieces of steel shafting run through the center of the roll and resting on notches in inclined supports, which are placed between each roll. This makes it easy to roll the belting off to a desired length, and each roll is supported by a short separate piece of shafting, so that any roll may be replaced without disturbing any of the other rolls on the rack.

Another suggestion for handling belt is to place the belting on strong racks mounted on low, broad-faced box wheels, and have rows of large-headed nails arranged in the floor one foot apart, with an arrow marking every fifth foot. Then the stock room man can take the end of the belt of the desired width and draw the belt off until the end reaches the desired length, measuring it by the nails. Then, placing a suitable weight on the end of the belt to hold it in place, he can go back toward the belt rack until he reaches the first nail, where he can cut the belt off and begin rolling it up as he returns to the weight.

Note the Concrete Floor, and the Well Painted Whit e Ceiling that Reflects the Light so Well in the Center Distance.

Many stock room men have no doubt experienced the difficulty of having to "dig" through boxes of red, blue, black and a half-dozen other colors of crayon when an order comes in for some light green crayon, say, and they know what an inconvenience and time-consumer this practice becomes. To overcome this difficulty, the mill in point has adopted a method of arranging the different boxes of each color crayon in vertical rows, separated by partitions and extending as high as might seem necessary. The boxes are of course marked as to their contents, and when an

order for a particular kind is received it is much easier to locate the particular color desired.

Also, stock rooms are often troubled with rats destroying brooms when these are stacked up in a corner. To alleviate this waste and annoyance, the brooms can be suspended from a wooden rack, which consists of long pieces of timber fastened to the ceiling in such a manner that neither the brooms nor the rack touch the walls. Large nails are driven in the sides of the racks, and the brooms are suspended from pieces of cord thrown over these nails. In addition to protecting them from the rats, this practice also gets the brooms off the floor and out of one's way.

Bolts of all sizes are kept in bins according to size, but because of the large number of these that are used, and the frequency with which they are requested, no perpetual inventory system is kept on them, and orders for bolts are turned in to the purchasing agent when the stock in some particular bin becomes low. The numerical marking system is not used on the bins containing bolts. These bins, and also those containing pipe fittings, etc., are separated from the main stock room, and the bins are labeled with the sizes of their respective contents.

Drills or other tools are kept in a cabinet in separate sections according to size, and the sizes are marked on each section, making it considerably easier to secure the correct size drill than would be the case of searching around in a bin filled with an assortment of sizes.

Ring travelers are kept in the original boxes in another cabinet and are arranged according to size.

In the past the bins which have been mentioned were usually of wood, built in sections containing a variety of sizes of bins or boxes which seemed at the time of construction to be best suited for the storing of the supplies of the mill. However, there has recently been introduced into textile mill stock rooms a type of storage equipment—steel shelving—which is a great improvement over the old familiar wooden bin in accuracy, simplicity, durability, safety and neatness. The accompanying photographs show three views of the installation of steel shelving at the Tupelo Cotton Mills, at Tupelo, Miss., by the Lyon Metallic Manufacturing Co., Aurora, Ill. The supplies had not been entirely allocated when the photographs were made.

As has just been indicated, in the older mills the storage facilities were constructed in sizes which seemed to best suit the needs of the times. However, in mill operation there is constant changing of the quantity of different replacement parts necessary due to age, operating hours and other causes. These in turn change the items carried in the supply stock and there is also a fluctuation in the quantity of pieces maintained of each item.

For this reason, flexibility of storage equipment is a much needed advantage in mill stock rooms, but with the wooden sections or bins, it is of course an expensive and troublesome proposition to change the size of the separate sections, and valuable space that might be used for some other article is often wasted.

This is pointed out as one of the advantages of steel shelving. In the photographs it will be noted that the shelving varies from extremely large compartments to the smallest possible size. Further sub-divisions, if desired, may be obtained by the use of adjustable compartment boxes. Through this means space that would be unused with wooden bins is utilized as additional compartments that will be found convenient.

Often mills find it desirable, particularly after a number of years of operation, to change the locations of their stock rooms. It is, therefore, a desirable feature in considering equipment for stock rooms to have it of such a nature that it can easily be moved, loaded from place to place, or that it can be taken apart and re-assembled, should it be necessary to pass through small doors, put the equipment in elevators, etc. It is evident that these conditions are fully met by steel shelving, which can be dismounted and re-assembled as often as desirable and with little effort.

Another feature of steel shelving is that it is much more nearly fire-proof than wood shelving. While not actually fire-proof, it so contains and retards fire that there is practically no danger of its becoming uncontrollable. Instances are not infrequent where fires burn themselves out within a compartment without spreading to the adjoining compartments. This, of course, is due to the fact that the air gets into the compartment rather slowly and that the fires are of the smoldering variety and cannot spread to the adjoining compartments except by heating the walls themselves.

The dangers of wood shelving, on the other hand, are well known. Fire in one compartment of a wood section would quickly eat its way through the walls, thus opening a draft and making it possible to spread to the adjoining compartments. Furthermore, such supplies as repairs for machines, etc., are usually oily, and this oil is absorbed by wood, increasing the danger of fire as well as spontaneous combustion.

The advantages of steel as far as durability is concerned need no comment, while wood used for shelving is frequently unseasoned, and since the cheaper grades must be used to secure the low price that justifies its use, the result is that it warps, cracks, gathers moisture and dampness, molds and otherwise rapidly deteriorates.

A practical and "meaty" booklet of 38 pages has been issued by The Texas Company on methods of steam turbine lubrication. The title is "Lubrication of the Steam Turbine." This is not a theoretical treatise intended for students, but is a practical discussion for men who use oil. It discusses from a practical standpoint the different systems of oiling turbines of different types, the manner in which these systems function, how they operate and the especial features of each type. Then, in logical sequence, it discusses how lubrication is affected by heat, water, deposits, cleaning, starting, oil coolers, etc., taking up the subject of reduction gears and giving recommendations as to kinds of oils to use under the different conditions and with the different systems, and exhibits diagrams of practical oiling systems.

This is not a "fancy" booklet, and it does not contain any pretty pictures, neither does it go out of its way to tell the history of the turbine from the time of its discovery by the ancient Greeks, but it is designed to be a practical and helpful discussion of the turbine and its lubrication, that will be of interest to the practical man in charge of the steam turbines, who is trying to secure the most economical and efficient results.

Any mill manager desiring to secure a copy of this instructive booklet for his master mechanic may do so by addressing The Texas Company, Department O, 17 Battery Place, New York City.

Popular Textile Chemistry

BY JAMES A. BRANEGAN.

PRESIDENT, KALI MANUFACTURING COMPANY, PHILADELPHIA.

Sulphuric Acid.

It has been stated that fundamentally our civilization consists only of the alphabet and iron. Of this fact we should not feel very proud as neither the alphabet nor iron is the invention of the ancestors of any of the people who predominate today. Our savage ancestors borrowed or absorbed these inventions from a people now forgotten or extinct. Civilization and progress however would never have been complete without the discovery of Sulphuric Acid, and of Sulphuric Acid we can feel justly proud as it is the invention of the peoples of the Christian era. The alphabet enabled us to record ideas and pass them forward with additions, while iron is the base of all mechanical work, but Sulphuric Acid is the foundation on which the chemical industry is built. Without iron mechanical problems would be theories only, and without Sulphuric Acid chemistry would be only a matter of physical changes and the products of the mill.

A nation's progress can be estimated by its production of Sulphuric Acid and it is a noteworthy fact that countries which produce little or no Sulphuric Acid produce very little of anything, and show little progress in civilized arts or sciences—Mexico and China being striking examples.

Sulphuric Acid was known to exist in combination with other metals for a great many years, but was not manufactured until about four hundred years ago, when an alchemist named Valentine, who like all early scientific men was a monk, found that when Sulphate of Iron, or "Green Vitriol" as it was then called, (it is now known as copperas) was distilled, an oily liquid was condensed which gave a strong acid reaction. To this liquid from the so-called "Green Vitriol" he gave the name Oil of Vitriol. It differed somewhat from the acid now sold under the same name inasmuch as it gave off fumes on exposure and was identical with fuming Sulphuric or "Oleum" which is now prepared by the Contact Process and to which I will refer later. Following up his experiments Valentine burnt some sulphur in a bell glass over water and made a great step toward the present chamber process when he burnt Sulphur, Antimony Sulphide and Potassium Nitrate in a bell glass over water. Finally some French chemists omitted the Antimony Sulphide and from that time it has been manufactured on a large scale. At first it was manufactured in glass chambers and the price was about ½ crown per ounce, but upon the introduction of lead chambers the price rapidly fell, the present price ranging from one cent to two cents per pound, according to quantity, the lowest price being for tank cars or tank boats.

At present it is made by burning either sulphur or pyrites, the latter being an ore containing iron and about 45 per cent of sulphur.

The lead "chamber" process which persisted for a number of years is gradually being displaced by the "contact" process particularly where strong acid is required. For the weaker strengths up to 52 degrees Baume' (known as Chamber Acid) the chamber process is still the more economical.

When sulphur is burned in the air, sulphur dioxide is formed, and in chemistry we call this SO_2 meaning 1 part of sulphur (S) and 2 parts of oxygen (O_2) the figure 1 in chemistry being usually omitted. This SO_2 wants another atom of O to form SO_3, ($SO_2 + O = SO_3$) and the SO_3 only needs some water (H_2O) to form Sulphuric Acid (H_2SO_4). Thus:

$SO_3 + H_2O = H_2SO_4$ or $S_2O + O + H_2O = H_2SO_4$

In the "chamber" process pyrites rich in sulphur, or sulphur itself is burned in furnaces supplied with air, so that once started they continue burning as long as fresh pyrites or sulphur is supplied. The gas (SO_2) is led from the burners through lead chambers and in its passage is mixed with nitrous anhydride which supplies the additional oxygen (O), while jets of steam or water vapor add the moisture (H_2O) and the weak acid is collected on the chamber floors and concentrated in iron pans or platinum stills.

In the "contact" process the ore is burned exactly as in the "chamber" process but after leaving the burners the process differs. In the contact process the gases are heated or cooled to an exact temperature and are passed with air through a catalyzer.

The word "catalytic" which is used to express the reaction in the "contact" process is simply a mask to cover something which actually takes place but which we can explain only in theory. A correct definition of "catalysis" in plain English would be as follows: "A new combination effected by one substance acting upon a compound body (or bodies), itself remaining unchanged." All we know is that the mere presence of platinum heated to temperature between 325 deg. C. and 450 deg. C. and in a finely divided state serves to induce and accelerate the reaction $SO_2 + O = SO_3$. In other words it induces oxygen from the air to combine with Sulphur Dioxide and form Sulphur Trioxide. One theory offered is that oxygen in the presence of heated platinum is converted into a "nascent" condition, meaning a condition in which it readily combines with substances or gases which are susceptible to oxidation. This "nascent" condition of the elements is thoroughly understood and proven in regular chemical reactions but in catalysis is only suggested by the writer as a theoretical explanation. Other substances are used as "catalyzers" in the manufacture of Sulphuric Acid, among them being Ferric Oxide or Oxide of Iron (Fe_2O_3) but platinum appears to give the best results. It should be explained that the same "catalyzer" will not answer for other reactions for instance in the manufacture of Formaldehyde we pass heated Methyl (Wood) Alcohol and air, not over platinum, but over heated copper gauze and the Methyl Alcohol is "oxidized" to Formaldehyde by catalytic action.

Returning to the subject, this catalyzer through which the gases pass, is a large chamber or cylinder filled with platinumized asbestos or other catalytic materials and when the SO_2 and O come in "contact" with this material they at once combine and form SO_3 with the evolution of much heat. This SO_3 is passed into dilute Sulphuric Acid ($H_2SO_4 H_2O$) whereupon the SO_3 combines with the H_2O forming

H_2SO_4 or strong Sulphuric Acid. By the contact process the strongest acid can be produced, so strong in fact that it fumes in the open air showing it contains a large percentage of Anhydrous (without water) Sulphuric Acid, a product exactly the same as that produced by Valentine when he distilled Green Vitriol as described.

It is important to note the difference between the "chamber" process and the "contact" process. By the former a weak or dilute acid is produced which has to be concentrated to bring up to "Standard 66 deg. Be," while in the "contact" process any strength desired can be produced direct. The burners where the pyrites or sulphur is burned are sometimes arranged in batteries like a row of retorts, but in late years mechanical burners are much used. These consist of a number of enclosed platforms one above the other, supplied with movable rakes and perforations so that fresh ore dumped at the top is raked from one platform to another, continually dropping, so that at the bottom nothing but cinders is drawn off. In the case of pyrites this cinder consists of Oxide of Iron which is usually supplied to blast furnaces and smelted into pig iron.

Sulphuric Acid 66 deg. Baume, such as is used in the dyehouse, is a heavy liquid, having a specific gravity of 1.8345 or nearly twice as heavy as water. It has an oily appearance and a slippy feel. It is usually water white or light brown in color and like most acids it has a sour taste and turns blue litmus red. Gold and platinum are not attacked by this acid no matter what the strength. Iron is attacked by the *diluted* acid but not the strong, while lead is attacked by hot strong acid but not by weak acid. Certain alloys like "Monel" metal resist this acid.

Sulphuric Acid is highly deliquescent, drawing moisture from the air and from any organic matter it comes in contact with, the organic matter being "charred" or destroyed. It is the presence of small amounts of organic matter which sometimes makes this acid brown in color. It combines with all bases and alkalis to form salts. It is in fact the most active chemical reagent known and it is this great activity and usefulness that gives it a place with iron as one of the greatest helps to man's progress. No other compound is used in the manufacture of such a variety of products as Sulphuric Acid. It is used for cleaning castings, and in the cranberry bogs to kill the weeds. We find it necessary to use Sulphuric Acid to make gas for balloons and it is used for pickling hides; for refining oils and for filling storage batteries; for making smokeless powder and by physicians to excite the appetite. Fertilizers, fire extinguishers, glycerine, and many other products all use Sulphuric Acid directly in their manufacture, while indirectly it enters into the making of nearly everything in use today. In the chemical plant it is indispensable. Such products as muriatic acid, nitric acid, hydrochloric acid, bluestone, Epsom salts, Glaubers' salt, and many other salts and acids are made by simply combining Sulphuric Acid with the various metals or bases.

In the textile industry it has many uses and no dyehouse is complete without Sulphuric Acid, it being used extensively in dyeing that class of colors known as "acid" dyes," while in the bleaching of textiles it is used to liberate the chlorine which in a nascent condition acts as an oxidizing agent on the coloring matter in the fiber.

Much has been written about the coal tar industry, but without Sulphuric Acid there would be no coaltar industry and while in making a dye, a product of coal tar like benzol enters the operation at the start, Sulphuric Acid enters at the start also and may be used again at various stages as the crudes develop into intermediates, the intermediates into bases, and finally the dye is usually a Sodium Salt of Sulphonic (Sulphuric) acid. So that in making a dye Sulphuric Acid is used at the start and at the finish and may be used in all the intermediate steps while the coal tar product is only used once. Furthermore, while substitutes have been found for coal-tar in making dyes, no substitute has been found for Sulphuric Acid. Even natural indigo was treated with Sulphuric Acid.

The production of Sulphuric Acid is enormous. In 1809 the United States produced 3,000,000 tons based on 50 deg. Baume acid and during the war this figure increased to approximately 8,000,000 tons, large quantities being required to manufacture "Mixed Acid" (Sulphuric and Nitric Acids mixed together) which was used to make smokeless or nitro powders for military purposes. Today the production is somewhere between these two figures. Shipped in tank boats, tank cars, drums, carboys, bottles and even by pipe-line, this acid is found where industry starts or wherever railroad, boat or motor truck reaches.

Workmen should be careful in handling Sulphuric Acid as it produces painful burns and quickly destroys the eyesight. Bicarbonate of Soda is a good remedy and should be applied freely to the burn. Water should not be put on a burn from this acid unless applied in large quantities and quickly flowed over the burn as water mixed with Sulphuric Acid generates a high heat and the pain is intensified. So great is the heat that the writer has boiled an egg in a mixture of Sulphuric and water. In mixing Sulphuric Acid and water great care should be taken to add the Sulphuric Acid *to the water* and not vice versa as otherwise the sudden contact of the water on top of the acid is equivalent to dropping water on molten lead and the sudden conversion into steam may cause an explosion and seriously injure the operator.

The best test for Sulphuric Acid or its compounds is to add to the solution suspected a few drops of concentrated Barium Chloride solution. If Sulphuric Acid or its compounds are present a white precipitate of Barium Sulphate is formed and if this white precipitate is insoluble in Hydrochloric (Muriatic) Acid it is evident that the acid or its salts are present and the former would be denoted by testing the solution with blue litmus paper which will turn red if the Sulphuric is present as acid. In making these tests C.P. (chemically pure) reagents only should be used.

In literature Sulphuric Acid has frequently been called the "King" of chemicals and in the writer's opinion it has well earned this name.

The next article will deal with Soda Ash.

Paige, Schoolfield & Co., Inc., 1 Madison Avenue, New York City, announce the merger of the Southern Cotton Yarn Co., Inc., and H. Ray Paige & Co., Inc. There has been no change in the personnel, and the officers, who are also directors, will remain the same. The domestic cotton yarn business, which up to the change had been conducted under the head of Southern Cotton Yarn Co., Inc., will be continued under the new name of Paige, Schoolfield & Co., Inc.

Southern Textile Association

The semi-annual convention of the Southern Textile Association was held in Charlotte; N. C., on Friday and Saturday, September 16 and 17, and it was truly the "Better Goods Meeting" that was promised.

The addresses delivered and the papers read at the three sessions were beyond doubt of a nature that has been unsurpassed in the history of the organization in the manner of careful thought and preparation, and every one treated upon its subject from an authoritative and authentic point of view.

Together with these interesting features, the practical discussion feature which has been of such value in the various sectional meetings of the Association was brought into use at each session, and the whole combined to make the convention a most beneficial one from every standpoint.

The First Session

of the convention was called to order at 10:25 o'clock on Friday morning by David Clark, chairman of the Charlotte entertainment committee, the headquarters being the ball room of the Selwyn Hotel. T. A. Hightower, superintendent of the Addison Mills, Edgefield, S. C., was called upon to render the invocation, following which the chairman introduced Rogers W. Davis, who delivered the address of welcome to the visiting mill men.

After the customary welcome of the visitors to Charlotte, Mr. Davis turned the trend of his talk to the Made-in-Carolinas Exposition which was in progress during the convention, and treated upon this affair with reference to its significance to the individual obligation of the individual man in the reconstruction of the world's production, and the establishment of stability in the commerce and trade of the world. Added interest was given Mr. Davis' remarks because of the fact he has recently returned from a trip abroad during which he visited the war-devastated countries of Europe and secured a first-hand insight as to conditions in those countries.

Mr. Davis said in part:

"We are very glad that you could be here at this time to see the Carolina Exposition. We believe that you will be proud of it as a Carolina and as a southern enterprise. We believe you will find it interesting and instructive and that you will enjoy its sights and its music.

"It seems that this Carolina Exposition must have a deeper meaning: First, it is a recognition of the interdependence of communities, of the interdependence of two great states, of towns, of individual citizens.

"Second, it is the effort of a great community trying to find itself, a community of two great states trying to strike a balance of its accounts, to balance its assets against its liabilities.

"On the credit side of its ledger are wonderful natural resources, an energy that is typified by our great electric power, a thrift that will put to blush a canny Scotchman, and a type of citizenship, pure blooded, that is equal to any on earth.

"On the other side of the ledger is disorganization and demoralization due to the four years of terrible destruction and wastage of the war. The destruction and waste is something positive, definite, something that can be counted. The shell which exploded on the battlefield was steel and powder, made up of invested money and human labor. Its cost could be figured in dollars and cents. When it exploded it was gone, absolutely gone. And there were millions and millions of them fired. If you could only see the torn up fields and destroyed towns of France, you could get some little idea of this awful wastage of capital and labor. There were millions and millions of yards of cloth completely destroyed, gone—cloth which was the product of your money, and your energy, and your toil. Do you get that?

"This Carolina ledger which must be balanced is your ledger as much as mine, whether you are from Texas or Georgia. Each individual one of us must balance a ledger.

"Right now it seems that the debit side far outbalances the credit side, but there is a perceptible brightening. The

President Gordon A. Johnstone.

only thing which can balance the ledger is production, the creation of something by energy and effort and toil that will replace that which has been irretrievably destroyed.

"There is a great tendency on the part of us all to 'pass the buck,' to say it's the fault of the war, or the fault of the Government, or something else, and to sit back and let someone else fix it. We say the 'Government got us into the war, and the Government must get us out. The Government must help the farmer and the manufacturer and the railroads.'

"But the Government can't make something out of nothing. What the Government has, or gets, must come from you and me. The Government, after all, is nothing more than a body of men whom you and I have selected to represent us, who are organized under a set of rules, to make laws and carry them out, laws for guarding our homes and our happiness and our prosperity. These representatives of ours have absolutely nothing which we do not give them, no money, no power.

"There is also a great tendency to form ourselves into groups, or associations, or unions, and to rely on the strength of the mass to put something over for us, to go on the idea that in unity there is strength. But there is that other old saying, that a chain is no stronger than its weakest link. In any group or association, or union, the individual persons, you and I, are these links.

"What we need is not more laws, nor more Government interference, not more group or mass action, but more individual personal responsibility, more personal initiative and more personal effort.

"The Southern Textile Association is one of the most effective and influential organizations in this country. It is an organization of doers, with a well defined plan and purpose. You men are the connecting links between the money invested in your plants, in mill buildings, spindles, looms, tenement houses, money which is nothing more nor less than savings; and between the people who work in the mills, the people whose energy and labor are necessary to production. The invested money, you, and the mill people together, are producing something that is a great fundamental, world-wide necessity which will help balance the ledger of individual and community and national life.

"You men of this Association have a great responsibility, and a wonderful opportunity. You have a responsibility and an opportunity for service to yourselves, your company, your people and your country.

"You have a first-handed touch with your mill people. Your responsibility is to try to show your people the present state of the great ledger account, where the balance is on the wrong side and what it will take to put it on the right side, show them their individual personal responsibility toward the situation, and show them how they will profit in sharing the responsibility.

"Your opportunity, which is unlimited, is to establish a cordial and sympathetic understanding between your people and the mill owner, an understanding of their mutual relationship and interdependence.

"The slogan of this meeting as shown by your program is 'Better Goods.' Better goods means individual responsibility, individual effort and initiative. Better goods, and more goods, means work, work, work. But it also means more comfort and prosperity for every one, the doffer and the sweeper, the superintendent and the stockholder, the farmer and the merchant."

Following this most interesting and inspiring talk, Mr. Clark presented Gordon A. Johnstone, president of the Southern Textile Association, who assumed charge of the meeting at this point, and called upon H. K. Hallett, superintendent of the Waterce Mills, Camden, S. C., and a member of the board of governors of the Association, for the

Response to the Address of Welcome.

Mr. Hallett's address showed careful preparation and treated upon a subject of vital interest to the mill man of today. It is to be commended to the careful consideration of everyone connected with the industry. Mr. Hallett said in part:

"Let me speak a few words about the Southern Textile Association. This Association has attained more practical results than any other association of its kind, due, perhaps, to the Sectional Meetings as much as any other one thing, the idea of which was conceived and put into practice by Gordon Cobb and ably continued by his successors.

"The potential benefit that this Association can be to its members and to the textile industry of the South is unlimited, because its membership is made up primarily of overseers and superintendents, men who are in close contact with the manufacturing and human facts of the industry.

"There come to my mind four points which might be taken as a basis of future study by this organization:

"First: We should keep up and expand the work of the sectional meetings, gathering more facts for the basis of research and manufacturing. Who are better fitted than the members of the Southern Textile Association to become pioneers in the discovery of new methods of operation by time studies and new ideas of machinery for the betterment of the textile industry. Frederick Taylor found a better way to lay brick, increasing the efficiency of the brick layer as well as his pay. The principles involved were unfortunately called scientific management, there would have been less prejudice if it could have been called common sense management, because, after all, isn't efficiency applied common sense, or simply the science of discovering how to do things more easily and accurately? There is never any work being done, which, if studied, couldn't be done better.

"At our last meeting in Atlanta, Mr. W. R. C. Smith mentioned the surveys which were being made covering eight or nine of the basic industries of the country. Since this meeting a report has been issued by W. R. Bassett, of Miller, Franklin, Bassett & Company concerning waste in textiles, in which he approximates the efficiency of this vast business as only forty per cent. By 'waste' in this report is meant, 'A failure to gain the largest possible productive return from that which we have, or from that which by the exercise of reason and intelligence we should or could provide.' There are certain features of this report which we will pass over, for instance the lack of stability in the general structure, such as marketing, price fluctuations, etc., but, gentlemen, one of the most effective methods of reducing waste in our mills is, as I have previously stated, by time studies of operative methods and constant research in the machinery and raw material used in the industry.

"The Textile Foundation, which, most unfortunately, is still in the embryonic state, may be the solution toward the reduction of waste in textiles. England today is ahead of us in the matter of research, over 90 per cent of all mills in Great Britain have subscribed to the British Cotton Industrial Research Association.

"As President Hopkins of Dartmouth College said, 'The acme of ambition, during the middle ages, was to know as much as the men before had known. The look was backward, not forward. Just as long as men look at things they do as ends in themselves, they will lack the perspective which will make the work they do most vital in the long run to the world's affair. We all know lawyers who are more interested in the intricacies of law than in securing justice. There are doctors, perhaps, who see in preventive medicine a danger to their practice. And the minister is not half rare enough who is more interested in the complicated questions of theology than in carrying conviction in regard to the Living God. And in the business world the great indictment has been that men have been more interested personally in acquisitiveness than in adding to the economic wealth of the world.' Now, we of the Southern

Textile Association can look forward and not backward, and can add to the world's economic wealth by expanding our research work.

"Second: There is a problem in which we certainly are in a position to assist materially, namely, the question of wage studies. Men are not born equal but they should be rewarded according to the service rendered. Several schemes have recently been advanced to take care of these inequalities, but I believe they are too complicated at present for the majority of operatives to figure out, so for now why not discuss the standardization of piece rates for every possible job, which we know is a fair way? The rate, however, should be carefully studied before applying.

"Third: For the better handling of our work during the present and future business outlook, we need to know business or economic facts, as well as manufacturing facts. We could, perhaps, be better informed or forewarned as to the trend of business cycles by watching certain barometers or groups of financial industrial and agricultural statistics. Some of us, possibly, have not the time to follow these trade indicators as closely as others, so why not get men like Herbert Hoover, Theodore Price, or other men of authority to talk at some of our meetings along these economic lines? Because, by having a knowledge of these principles we would be better able to talk to the operatives upon business conditions. Lay the cards upon the table, your costs and other problems, it is illuminating, if you never have tried it, at the more complete understanding of your manufacturing questions. It, perhaps, has not been done in the past, but why should we always follow precedent? Why is Henry Ford called the industrial wizard of today? Because, as John H. VanDeventer said, 'His success has been due to his combination of resourcefulness with the ability to think from cause to effect without obscuring his mental process with precedent.'

"Fourth: Costs, a word which has caused many a worry during the last year, yet there could be a more complete and beneficial understanding of this subject if properly discussed.

"In conclusion, as the Manufacturers' Record has said, 'It is time to play ball.' Never before in the history of the South has there been more building going on, churches, schools, dwellings, etc. This same spirit applied to business channels can quicken the business activities of the whole South. Now is the time to get ready for the boom, and the Association can do its part, first, by increased interest in the sectional meetings and the development of pioneers in the common sense question of time studies of different mill operations and new ideas of machinery through research; second, by an intelligent study of wages; third, by broadening the interest of its men in business and current economic facts; and fourth, by a more intelligent knowledge of costs.

"Through this Association we have a field unsurpassed anywhere in the country for the development of industrial leadership and talent; and we can benefit ourselves and the mills we represent by giving service to the Association."

At this juncture Secretary A. B. Carter, of the Association, asked permission to make a few remarks in memory of one of the most faithful and loved members of the Association. "One week ago, at this very moment," said Mr. Carter, "a member of this organization who has been identified with this organization since its beginning was laid beneath the sod. If he had been a big man, a president of a cotton mill, I would not have had a word to say. He was a man who started in life with effort and toil. He loved his home, his country and his work, and he did a great deal for the industry with which he was identified. No greater epitaph could be put on the tomb of a king. I speak of none other than plain Jack Iler. He lived a life that was righteous and an inspiration. He was a good man, and this is, so far as I know, the first time we have mentioned in a meeting of this organization a person who has departed from us, but just at this moment I could not let the time go by without saying a word in memory of the man we all loved."

Following Mr. Carter's remarks, President Johnstone made a few supplementary statements in regard to the economic part which the southern cotton mill man must play in world production. "During the strenuous times of the war," he said, "we didn't pay much attention to cost of production, as orders were coming in fast enough, but this question has been brought to our minds during the last six months, especially in the cotton mills where we have felt the slump and have been obliged to retrench.

"There are so many ways cost can be reduced without a cut in wages, but the thing that most of us are prone to do is the easiest thing. It should be our earnest endeavor to do those things in our plants that will give the best results. As Mr. Hallett pointed out, cost is one of the most potent things in this part of the industry. One thing I hope that we will develop in these meetings is the question of management and its relation to cost, and that we may train the men who are here, and the department heads in our plants to take the executive positions in the mill.

"The question of management is of vital importance, and bears a direct relation to cost, and this is going to be a very important thing during the next year, for the reason that we must manufacture at a cost that will allow a margin of profit. It is up to us men to so cooperate with our companies that we can make this margin as large as possible and get the best results. I am also very glad that there has been a much better tone since we met in Atlanta. We in the South can rejoice that cotton has gone up, and we all hope that it will be our salvation to better conditions, I am sure."

The chairman then introduced R. McHardy Mauldin, manager of the southern office of the J. Spencer Turner Company, as the next speaker. The subject to be discussed was

Cotton Yarn Defects

and Mr. Mauldin announced that he was present as a pinch-hitter, inasmuch as the paper he would read was prepared by F. L. Walton, of the New York office, who had been unavoidably detained from attending the meeting. He then read a very opportune paper on this subject, which follows in part:

In coming here today to talk with you on the subject of Cotton Yarns and its Defects, I believe that each of you probably knows more about the manufacture of cotton yarn than I do. So I am not going to try to tell you how to make yarn, but how not to make it. From some of the reports we get from customers, there are still a number of mills who know better how not to make it, than how to make it, but I believe this point is still an open question.

When I left the mill and entered the selling end of the business a number of my friends stated that I was simply looking for an easier job, and wanting to get away from all the mill problems and worries. If this was the case, I was badly mistaken, for I found my troubles had just begun; and while you won't agree with me, I am going to make the statement that a mill man has a snap beside the troubles of a selling agent; and I realize you have troubles aplenty every day.

You have probably heard the expression by some of the returned soldiers that, "The next time there is a war, they will join the Navy," and sailors remark that, "The next time they would join the Army." Well, that's about the way I feel regarding the troubles of a selling agent and a mill man, and when I had the choice, I accepted the other. Considering all this, at best, it is a toss up as to who has the most troubles, and it certainly behooves us to get together and see how many of these troubles we can eliminate.

You have often heard the expression by mill men that "Every customer will find fault with any yarn if the market is down." At the same time, I have often heard customers say that, "Most every mill will make poor yarn on a rising market where the yarn bought cheap cannot be rejected." I have also heard mill men say that commission houses and selling agents always favor the customer instead of the mill, and I have heard customers say that, "Selling Agents do not insist on the mills delivering good yarn, and delivering same on time, and that they always favor the mill." With these ideas prevailing, you can easily see that the selling agent must be a good shock absorber as well as a central switch board for trouble every day.

Seriously, we all know that such expressions, as a rule, are simply idle talk, but underlying it all, there are, to some extent, some ideas which should be eliminated.

I am firmly convinced that the strict application of two words to the yarn business will eliminate a lot of our troubles for the future. The two words are "understanding" and "cooperation," and these will be the key-note of my talk today.

By "understanding," I mean that a selling agent should understand market conditions, his customer's requirements, mill conditions, the quality of the yarn being sold, and every time be certain of full understanding on the part of both the customer and the mill. The mill, on the other hand, should understand the importance of making the yarn right, the troubles caused customers from bad yarn and the importance of delivery on time. The mill should realize the peculiar conditions under which selling agents operate in handling a large number of customers for several different mills, and should understand how necessary it is to fully comply with all the terms on their contracts. There is, of course, the human equation to be considered but by establishing confidence and working close together we can come pretty near to a full understanding.

"Cooperation," in a way, should be the results of "understanding," as understanding and cooperation are always required to settle a dispute in a satisfactory way. I believe that any dispute can be quickly settled by getting the customer, the mill man and the selling agent together, as I believe each of them wants to be fair, and where they understand each other, a quick settlement may be made. Some of us have had unfortunate experiences in which we have thought we were not treated properly by a customer, selling agent or mill, but it has been my experience that most of these misunderstandings may be quickly corrected if the proper attitude is assumed by all parties.

Inasmuch as the mills are usually at some distance from the customer's plant where the yarn is held, it is an expensive proposition for the mill man personally to visit the customer, and in most instances the mill man does not want to take the time or incur expense to inspect the rejected yarn. It is here that misunderstandings occur, as the selling agent must represent the mill in such instances, and should do so with all fairness to the mill and to the customer. The mill should have confidence in the selling agent and give the proper cooperation to terminate the claim in a way fair to all concerned. A fair minded customer has more respect for a selling agent who stands up for the rights of the mill, and would prefer doing business with such an agent, feeling that he would give better attention to his business. Some mill men, I believe, do not realize this fact, and in most instances do not give the proper cooperation in handling claims which arise.

On the other hand, you have probably had unjustified claims, even where you felt that you had given full cooperation to the selling agent and to the customer, and in such instances it is always best to see the yarn yourself so the difference can be settled. The best answer to this is for each mill, selling agent and customer to do business only with those in whom they have confidence to handle their orders where such differences will not arise.

Delivery in accordance with the terms of the contract is essential and important, as a customer buys yarn in certain quantities to take care of his production, and if the yarn does not arrive, you, as mill men, can easily see what trouble he is up against. You experience the same trouble in handling your cotton and realize what a useless expense it is to shut down your plant simply for the lack of cotton. You demand delivery of your cotton and a yarn customer demands delivery of his yarn, and in many instances feels it necessary to buy against a delinquent contract, to keep from shutting down, and it is here that some disputes occur. It is of small interest to the customer as to why the contract is delinquent, as the customer wants yarn and does not feel that his plant should shut down simply because you are having trouble at your plant, regardless of where this trouble lies. In many instances, on an advancing market, you might have over-sold your production, thinking you might make a little more; and in other instances you have fallen down on deliveries through various causes, over which you have no control. But regardless of why the delinquencies, you should feel the necessity of speeding production to live up to your contracts. If all contracts were delivered on time, a lot of trouble for the selling agents and customers would be eliminated, and it would promote a better feeling and more cooperation between customer, selling agent, and mill.

So far, I have covered the yarn question in general, but now I will place before you in detail a few of the complaints which we receive quite often from manufacturing defects in the yarn. Many of you are making ball and chain warps, which form causes quite a lot of trouble, mostly from carelessness. Doubtless, some of you do not realize

that the warps you make are mixed at the customer's plant with fixe or six other warps from other mills, which warps may be silk, cotton, or woolen, and much more expensive yarn than yours. If your warps are made short, then it is necessary for the customer to cut off the same shortage from all the warps mixed with yours, which, as you can see, is a big loss to him, and the customer cannot determine the length of warp until it is placed in process. In addition to this, the customer has sold a piece of goods to be made a certain length, and your short warp causes him to make short pieces which must be sold at a discount, and which causes a lot of trouble between him and his customer. If the warps are too long, you not only lose the extra yardage, but it seriously inconveniences the customer in trying to beam same, and handling the waste at the end of the beam.

It is important to lease a warp properly as a poorly leased warp is not only expensive, but cuts down the customer's production. In many instances mills ship warps without the proper number of ends which, of course, makes the warp useless to a customer as a certain number of ends is required in his fabric. Another important item right here, is to have your warps properly packed for shipment, to prevent the warps from becoming broken and damaged in transit; and a good method of packing warps is to have two thicknesses of both paper and burlap, and carefully sew the bales together to prevent open places where the warps will get dirty and torn.

When a warp is made wrong for any reason, it should be reported to the selling agent, asking that arrangements be made with the customer to accept same if possible, and if the warp is accepted, it should be plainly marked with a ticket giving in detail the exact trouble with the warp.

Rolled warps are also objectionable to the customer as it places an uneven pull on the yarn, and is very hard to beam. You can easily eliminate this trouble on your warper. Recently some trouble has been experienced with ball warps being wound too loosely on the shell, as in transit the ends sluff off and become tangled around the end of the shell, where it will not fit in the customer's machines. Ball warps should be wound with enough tension to prevent this. We have found it a good idea to place a light veneer head on each end of the shell inside of the packing and this holds the yarn in place.

With tubes, we have had serious trouble from yarn overrunning the ends in winding, which causes the ends to break down in beaming. Also, many tubes are too loosely wound and from handling in transit, the ends bulge and extend over the ends of the paper tube, so that the yarn becomes chafed when placed in a creel for beaming. If you are winding two end tubes, care should be taken to see that the two ends run parallel without lapping and that when a knot is tied, it is tied only in the single end and that both ends are not tied together. Such yarn is run in braiding machines by the insulated wire customers and will stop the machines if the two ends are tied together. Skeins should be made as specified for weight, and it is especially important for the lace trade to have the skeins the proper weight. Trouble has developed several times from mills shipping 2½-oz. skeins for 3-oz. and 5-oz. skeins for 6 oz.

Most of the trouble in knitting yarn develops from being unevenly spun, not true to number, and from the yarn containing too much leaf and foreign matter. Conditioning of knitting yarn is very important, and one to which a mill should give careful attention, as the yarn should be properly conditioned to get the required results. But a mill should not try to sell water. A knitter is very particular about the yarn he buys and the reputation of your mill is at stake all the time, for a knitting customer will not use yarn with which they have previously had trouble.

One of the most important facts I want to mention today is the question of packing yarn for shipment. Many mills pack in cases which are entirely too frail, and when a complaint is made, the only answer we get as a rule, is that they have never had a complaint before on the cases, and that the transportation company handled the cases too roughly in this instance. Cases should weigh between 300 and 350 lbs. net weight of yarn, and the cases should be made from ¾-inch lumber to stand the rough handling they get. Some of you probably do not realize that in some instances, cases are shipped two or three times, and in other instances, the customers want to use the cases to ship their goods in. Many times a mill gets the preference on an order by making good cases for the customer. Cases should have reinforced heads, and should be strapped with steel bands at each end, but in no instance should a steel band be placed around the center of the case. One of the best tests we have found for cases is to fill the case with yarn, place it on top of another case and drop it on the floor, so that it will fall on the corner; and do this three times. If the case does not give way, it should reach its destination in good shape. If you will do this, you may rest assured that most of your cases will arrive at destination in good shape, and without complaints.

In shipping section beams, care should be taken to see that the beam is tightly and evenly wound of even selvage and that the proper yardage is on the beam. Beams having wooden, wrought iron or pressed fiber heads should be used, as cast iron heads are easily broken in transit causing not only a loss to the spinner, but serious trouble for the customer. The packing of section beams is particularly important to prevent damage to the yarn. Two thicknesses of heavy paper should be wound around the yarn, fitting closely between the heads, and this paper either tied or held together by stickers to keep dirt off the yarn. Around the paper should be a thickness of burlap fitting close to the heads and then entirely over the heads and sewed in place. Around each head should be a padding of burlap or cotton packing to form a cushion to prevent the head from digging into another beam next to it in transit, and it also protects the head itself. In loading, the beams should be secured in the cars by cleats so as to prevent moving.

In packing bales care should be taken to see that they are lined with paper to keep out dirt and the bale should be closely sewed all around to prevent pulling open. The burlap on the head of the bale should overlap the sides and be tucked in three or four inches; then if the stitches pull out, the yarn will still be protected. Heavy burlap should be used to prevent damage from hook holes and the bales should be firmly reinforced with a sufficient number of bands to prevent damage caused from a loosely packed bale.

One of the most promising markets for cotton yarn today is the export business and the packing of export shipments is vital to the success of this business. If you stop

to consider that the yarn must be handled a dozen different times by rail, truck and boat, and in many instances travels almost entirely around the world, you can easily see why it must be properly packed. The bales should be lined with two thicknesses of heavy paper and then covered with two thicknesses of heavy burlap. If you will pack a bale and use a hook on it, you will see the importance of two thicknesses each of paper and burlap, as you will notice that the hook goes into the bale at an angle and when withdrawn, one thickness of burlap or paper will most likely cover the hole in the other thickness and prevent dirt from reaching the yarn. The bales should be tightly compressed and carefully strapped and the smaller the bale, the less freight the customer must pay on the shipment. Export shipments pay freight on cubic feet measurements and at the present time it figures $1.00 per cubic foot so you can easily see the saving involved by proper packing. Right here, I might mention the importance of making export yarn right and shipping only good quality yarn, as export customers buy repeat orders based on the kind of yarn shipped them previously; and if the yarn is poorly made or badly put up you will not get the repeat order. It takes a long time for the export customer to get the yarn, and he cannot take chances on getting bad yarn.

The Yarn Discussion.

At the conclusion of the reading of this paper, President Johnstone announced that the discussion on this subject would be led by Arthur M. Dixon, of Gastonia, N. C.

Arthur Dixon's batting average as a racouteur of laugh-provoking stories and his ability to produce a smile and a laugh on the most soured countenance, seemed not to have decreased a bit, for he injected into his remarks, in true Dixon style, some pretty good ones.

In discussing the feature of making yarns just as the customer wants them, Mr. Dixon said that not long ago he had gone North and visited some of the plants which consume the yarn from his mills, and had seen just how they were used and with what other products they were combined in the manufacture of fabrics. "It gave me a better idea of the importance of making the yarn like the customer requests.

"When I saw the class of goods our yarn is going into, I was impressed with the value of a superintendent going to the plants where his yarn is used. I believe it would be a good investment for any mill making sale yarn to send their superintendent to such plants and let him see for himself just what his yarns are used for.

"After my return from the North, we were sending some yarn to a mercerizing plant, and my assistant at one of the mills came to me and said he would like to take some of the spooler hands and warper hands and section hands and second hands, to the mercerizing plant so that they might see what was done with it there. He took them, several cars full, and when they came back they had a much better idea of how their yarns should be made."

In considering the connections of the mill with the commission man, Mr. Dixon told some humorous experiences, but declared that as a general proposition, these men are familiar with the manufacturing end of the game, and that the greatest of cooperation should exist between these two factors of the industry.

Mr. Dixon stressed the importance of the export field for textiles, expressing a belief that therein lie great possibilities for southern mills.

In concluding, the speaker declared that there are two ways to manufacture cotton yarns, one is to look for the very best quality, and the other way is "to make production your God" and see how cheaply they can be manufactured.

Taking up the recently mooted subject of the difference in price between southern yarns and eastern yarns of apparently the same grade, Mr. Mauldin asked the reason for this difference. "You put just as good cotton in, and use similar processes, and no doubt have better machinery and better operatives than the other fellows, and yet they get more money for their product? What is it that you leave out?," asked Mr. Mauldin.

Mr. Dixon said that in his honest and candid opinion, there are southern mills that are making just as good yarns as are made in the East, and said that there has been a reason for the fact that northern yarns have brought a premium over southern yarns. He said that when the textile industry was started in the South, the tendency was toward manufacturing the heavier goods and coarser numbers, while the mills in the East were making the finer products. Each year has shown, however, said Mr. Dixon, that the southern mills are producing better yarns every year, and it shouldn't be long before the discrimination as established by tradition should be overcome by the superior quality of the southern product.

W. H. Harriss, vice-president of the Liberty Textile Corporation, New York City, who was present during this discussion, stated by way of answer to Mr. Mauldin's question that he attributed the difference in prices between southern and eastern yarns to a large extent to the freight rates that must be paid on southern yarns to eastern centers.

President Johnstone at this point asked for discussion from some of the manufacturers of sale yarns who were present, and called upon B. F. Gardner, of Charleston, S. C.

In the course of his remarks, Mr. Gardner referred to the paper which had just been read on defects of yarns, and said, "The one thing that impressed me most was a thing that is often overlooked, and that is the form of packing. The yarns we manufacture (Mr. Gardner had previously stated his plant makes asbestos yarns) are very heavy, and it is necessary that we have strong packing. Very often orders are rejected because of improper packing. A great many times poor packing has caused blame to be placed on the manufacturer, when as a matter of fact the yarns were made all right, but when they reached their destination they were unusable.

"I have found it is far better to spend a little more money in putting the yarn up in proper packages, so that they can stand the transportation and varying conditions to which they are subjected, and then it is in a form which can be used. That is what the customer is paying for, and he wants to use every pound he buys.

"It certainly is a short-sighted policy on the part of manufacturers to spend all of their time and energy in the mill and the processes, and turn out a product of high quality, and then have the whole effort frustrated by poor packing.

"I am a strong advocate of good packing. I have paid as much as $1.50 a case, and we find in the long run that it

pays, and we are experiencing the results of carefulness.

"Packing is a point that is often overlooked by manufacturers, but it is a point that merits careful consideration," concluded Mr. Gardner.

H. G. Wingate, of Gastonia, N. C., was next called upon. Mr. Wingate emphasized the remarks of Mr. Dixon in regard to visiting the mercerizing plant and seeing just where the yarns are used. He has found this to be of good advantage, he said, and believes it will help any mill.

"In regard to shipping," he continued, " I find a great deal of trouble in finding out what the customer wants." He cited an instance wherein he had had some warps packed in a special manner for one man, and it suited him all right, but when another customer's yarns were sent out in a similar manner, a complaint was forthcoming.

"One man was pleased with this method, and the other wasn't," said Mr. Wingate. "The thing that pleases one man doesn't always satisfy another, and I think it is largely a matter of cooperation between us mill men and our customers. We should find out each man's particular ideas and ship them that way."

Following the discussion of the paper read by Mr. Mauldin on yarn defects, President Johnstone announced that Secretary Carter would introduce the next speaker, who was William H. Harriss, vice-president of the Liberty Textile Corporation, of New York City. This Mr. Carter did in his own style, presenting the speaker as a man who had worked through the mills of the South up to the position of president and who had then entered the commission field. Mr. Harriss then spoke on the subject of

Cotton Cloth Defects.

As an illustration of the processes in the manufacture of cotton into cloth, Mr. Harriss used the illustration of a bird hunter, who, on becoming thirsty, finds a stream of cool, clear water coming down from a spring. However, it is generally found to be the case, said the speaker, that the hunter's dog has preceded him to the stream and invariably goes further up the stream toward the spring, thereby muddying up the water making it unfit for the hunter to drink.

"To my mind," continued Mr. Harriss, "that stream with the spring above and the dam below represents the processes of cotton manufacturing, and it is up to you mill men to keep that stream clear and to see that your product goes down that stream, 'over the dam' as first-class merchandise. The spring in the story could represent the cotton supply, and the dam be called the cloth room. If the dog gets in the stream anywhere along the line you are lost. Again, if you have the wrong cotton for the goods being made things will go badly. But it is absolutely important to know in the cloth room whether the dog has gotten in there." Mr. Harriss here emphasized the necessity for having a perfect inspection in the cloth room.

Some philosopher has said, the speaker continued, that the most pathetic man in the world is the man who is surprised. And the mill that hasn't the proper inspection in the cloth room is liable to get surprised at any time in the form of a complaint from their customers, and that is when the mill man is pathetic, when he doesn't know what is going through his plant and on to the customer.

It is, therefore, said Mr. Harriss, important to the interest of both customer and mill that the proper inspection of the cloth be made in the cloth room, as the reputation of the mill lies in its product and is at stake.

He next told a story of an old established New England mill, which had been operating for forty years and had the reputation of never having had a complaint on the product. During the recent period of depression, when prices on goods were going down, this particular mill received a "kick" that some of their goods were not up to standard. They immediately wired back that if such was the case, they would send a representative to New York to get the goods immediately, as they had been operating for forty years without a complaint, and if this one was justified, they really were glad to have found a "four-leaf clover," that they were glad something had been found wrong with some of their product. That if the goods were as bad as the report stated, they wanted those goods back to put in a frame and hang up in the office.

"But that mill knew that the cloth was all right," declared Mr. Harriss, "or else they would not and could not have made such an assertion. They knew that their inspection was perfect, and that the fault was not in the goods, but in the man making the complaint. Otherwise they couldn't have said what they did.

"In the marts of the cotton cloth trade," continued Mr. Harriss, " it has been fairly well agreed upon for many years that southern mills do not inspect their cloth quite so well as do those in other sections. Much of the criticism along this line was in part justified and while great improvement is noted in recent years, yet there remains room for further advancement.

"The difference in daily nominal quotations on certain staple cloths between the South and East is largely accounted for, I think, by necessary adjustment of freight to finishing works, and that is why I brought up this question with the gentleman a moment ago. However, the belief that eastern goods are more carefully inspected and better packed has some bearing on price differences.

"Now, if we agree there is room for improvement we must next analyze the many defects in cloth with which we have to deal. Before passing on to what we might call mechanical defects we should first consider natural defects in cotton, such as trashy, blue, gin cut, ribbon, stained, weak or wasty fiber, mixed with jute fiber, etc.

"And I would like to especially call your attention to that last point, about mixed with jute fiber. Often some of the bagging will get into the stock and go on through the mill. The mill man should watch for this, and should never use such cottons unless it is thoroughly agreed beforehand that they can be spun and woven into cloth suitable for the given purpose.

"In dealing with the cloth from the loom, we will first consider the defects attributed to faults in the yarn, some of which are as follows: Warp or filling or both uneven; warp or filling or both cockly; warp or filling or both motey and nitty; warp or filling or both kinky; warp or filling or both oily black or oily yellow; warp or filling or both with slugs; and warp or filling or both too knotty. These things of course all affect the weaving.

"We will next consider defects due to weaving faults, as follows: Scratch-ups, pick outs, shuttle marks, ends out, warp entanglement, filling sloughs, wrong drawing, wrong reeding, poor face on cloth, smashes, thick and thin places, reed marks, loose ends on face and on selvage, coarse picks, overshots, tight selvages, sand roll damage.

"Now, the number of these cotton, yarn or weaving defects carried by a given piece of cloth determines its grade. If they are numerous, the cloth is unquestionably seconds, of occasional, the cloth may be firsts, and if scarce the cloth is surely first quality.

"In addition to those defects mentioned, certain possible incidental causes of trouble must be given, such as the following:

"Bowed filling—where cloth has been roughly handled in the folder or the brushing machine, this will cause the filling to bow or bias.

"Turn downs—or creases, which occur when the cloth is passed through some calender roll, and if a crease gets in, it will result in the cloth being ruptured, and pinched so hard at these creases that the cloth is cut.

"Short laps—where the cloth folder is so set that each lap is under the standard 36-inch yard, causing the delivery to be short of invoice yardage. Many mills have the good practice of going over these machines at regular intervals and testing them to see that they are giving the correct length laps.

"Poor baling—where goods will be damaged in transit.

"Poor marking—where identity or origin of the goods may be easily lost.

"Now we arrive at the consideration of defects of construction about which, unfortunately, there is no general agreement. Let us take a standard cotton sheeting, 36 inch, 56/60 4.00 yard; what should be the allowable variation, or 'cloth tolerance' as it is known in the markets, for a commercial delivery?

"In regard to width, some claim that not more than 3/8 of an inch below nor more than 5/8 of an inch above should be allowed. Others say two per cent above and below. Unquestionably the percentage basis is the proper one, and I would suggest one per cent below and two above as fair, the selvage always to be included in the total width.

"Count—sley. Naturally the sley must carry the same percentage as the width, one per cent under and two above. In all cases the total ends in the warp must be the sley times the width plus the number of extra ends to give the proper selvage.

"Count—pick. A wider variation is needed here as many looms are so geared as to make it impossible to give the exact pick, so four per cent each way would seem fair.

"In connection with the weight, in all disputes regarding weight of cloth, tests should only be made where the goods have been exposed for twenty-four hours to an even atmospheric temperature of 70 degrees Fahrenheit and a relative humidity of 70 per cent. Furthermore, a bale of goods must be the unit tested for weight, but no piece must vary more than 2½ per cent, whereas with a bale as the unit the variation should not be over 1½ per cent light and 2 per cent heavy. Nor is it quite fair for a contract to be written 'not lighter than 4.00 yards to the pound.' The contract should specify '4.00 yard goods' and the percentage named should take care of the variation.

"These percentages, applied to the standard cloth mentioned—36 inch 56/60 4.00 yard—will give us the following figures:

	Width	Sley	Pick	Weight
Standard sheeting	36"	56	60	4.00 yd.
Minimum allowable	35.64	55.44	57.60	4.06 yd.
Maximum allowable	36.72	57.12	62.40	3.92 yd.

"The foregoing percentages of variation I present for what they are worth and submit them for your criticism. I think you will find them more or less in accord with trade custom, cotton manufacturers' association, and the rubberizers, although there has been no general agreement in adopting any standards through the trade. However, there is great need for a general standard, and if the foregoing meets with your approval it might be well for your association to adopt them as the standard and thus start the movement to make them generally acceptable and used. Another point not covered is the question of short lengths. This depends somewhat on the character of cloth involved, but in no case should a piece under thirty yards be considered full length unless previously agreed upon.

"In most cases a forty yard cut is a minimum. Where there is a minimum established a mill is not justified in attempting to ship in each bale a few pieces under the standard simply because they have passed on previous occasions.

"As you can imagine, different finishers dislike certain defects more than others. For instance, a piece dyer dislikes to get goods with mis-draws or threads out in the warp, also shuttle marks.

"A bleacher dislikes tight selvages and colored insoluble chalk marks and a printer is very particular about loose dangling threads on selvages or the face of the cloth, whereas goods requiring a satin of Schreiner finish must be practically free from knots or slubs.

"I am not going to discuss the strength of cloth, but it seems to me that we should have some kind of a standard for cotton cloth. Take the Draper table for yarn breaking strength, why there is no reason why we should not have a standard for cloth breaks. I hope we can promulgate a table showing breaking strength required for different constructions, and then a man making sheetings, for example, can know how it compares with others.

"The railroads have brought that up as the fact has been impressed upon them by the numerous claims for damage from shippers of flour and cement, and they are not going to accept shipment of commodities in bags unless the cloth from which these bags are made is made up to a standard which they themselves are going to promulgate for their own protection."

Cloth Discussion.

The discussion on this subject was led by John W. Clark, of West Durham, N. C., vice-president of the Association and chairman of its committee on cloth and finishing. Mr. Clark declared that he thought there are five points in connection with cloth room work that are of paramount importance: First, an abundance of light during daylight hours and also when artificial light is used; second, speed of inspection—fabrics should be put over the inspection table at such a speed that each piece can be inspected carefully, and no faster; third, good inspectors—the greatest of care should be taken in the selection of these important workers; spare inspectors—they should be specially trained for the work, and no man should be put on this job unless he is thoroughly reliable and has been trained to the duties of the position; and fifth, the matter of records—records should be kept of all imperfections, thin streaks, short pieces, etc., which will furnish a check

upon the loom fixer, the section man, the weaver and the loom responsible for the imperfect work, and the blame should be correctly placed.

John W. Arrington, president of the Union Bleaching and Finishing Company, Greenville, S. C., said that he would like the opportunity to bring to the attention of the mill men a point that was most important from the bleacher's standpoint, and that was the practice of some mills in splicing the ends of rolls of cloth. Of all the horrible things that confront the bleacher, this is the worst, he said. "We start the cloth in process after sewing it together in lengths of twenty-five to thirty miles," said Mr. Arrington, "depending on the width of the cloth, and it goes through at a pretty high speed." If the goods are spliced, he explained, the loose end will fly through the pot-eye and this plays havoc with the bleaching of the work, as the process must be stopped and the loose end traced up and brought back.

Later in the meeting, Mr. Arrington again addressed the meeting. "I have just returned from New York where I attended the convention of the National Association of Cotton Finishers. At this meeting a matter came up that is of the most importance to cotton mill weavers. That is the matter of using magnesium chloride in warp sizing. You may be using it in your softener and not know it. I do know that it appears to get in some cloth."

The chemical action of this ingredient is very detrimental, explained Mr. Arrington, especially in goods that are going through the singeing or gassing process, and makes the bleaching go very badly. The general action of this chemical is to so affect the goods that when it is subjected to an extremely high temperature, as is the case in singeing, the process not only singes the hanging threads but also goes through the cloth. It was advised that mills investigate and do not use this material in their size. Mr. Arrington stated further that the National Association of Cotton Finishers decided at their New York meeting to circularize all weaving mills urging them to eliminate this chemical from their slashing process.

Friday Afternoon Session.

The second session of the convention was called to order, after a recess for luncheon, by President Johnstone, and this session was devoted to a discussion of raw cotton and its characteristics. The principal speaker was David R. Coker, of Hartsville, S. C., well known cotton breeder and grower, who is also a cotton manufacturer. Mr. Coker spoke on the subject of "The Spinning Value of Cotton and How It Can Be Increased," and because of his long and intimate association with cotton plant experimenting, his remarks were very beneficial and enlightening to the mill men on this very important phase of their work. Mr. Coker's remarks follow in part:

The Spinning Value of Cotton.

I have not in a long time received an invitation which gave me more pleasure than the one extended to me by the chairman of your program committee to address this body of men who have as much practical knowledge of the spinning values of cotton as any equal number anywhere in the world. For about twenty-five years I have been a student of the cotton plant and its character, and a large part of my life work has been devoted to its improvement in yield, length, character and all other points which make for spinning values.

You will all agree that a primary essential to the operation of all cotton mills is their raw material. You will also doubtless agree that no matter what average length cotton the mill may use the spinning results depend largely upon the strength and uniformity of the fiber. It is clear, therefore, that each one of you is, or ought to be, deeply interested in all intelligent efforts for the improvement of the spinning value of the cotton crop and that you will see that it is to the interest of your mills to further all such efforts. There are two natural principles which the breeder, who would improve any race of plants or animals, must understand. First, the principle of "natural variation." Second, that "like begets like." These two principles are upon their face opposed to each other but are not really inconsistent. Let me illustrate. In a high milk producing strain of dairy cattle no two cows produce exactly the same amounts of milk and butter fat, although all are descended from high producers. This illustrates the principle of natural variation. The fact that nearly all of the progeny of high producing individuals make high producers of milk and butter illustrates the principle that like produces like. By continually selecting only the highest producers for breeding it is always possible to further increase the average yield of any race of plants or animals.

If you will go into any field of cotton and comb the seed from each of a number of plants you will find a variation, often very great, in the length of the fiber, in the uniformity of the different fibers from the different plants, in the percentage of lint to seed, and in the strength of the fiber. If you are working with a highly pedigreed strain these variations are apt to be very slight, although by combing thousands of plants you may find one considerably longer and a few considerably shorter than any of the rest. In proportion as the breeder finds many or few variations in a field will the cotton from that field be wastey and irregular or even and satisfactory. These variations in cotton are the basis upon which the plant breeder works. In beginning his work he selects a good variety which he thinks offers possibilities of improvement and plants a field with the seed, giving each plant a uniform distance in the row. When the cotton is mature he examines thousands of plants as to their visible features and selects a large number of individuals which apparently have characters of earliness, high production, large size of boll, uniform strong lint of high per cent vitality and disease resistance of plant, etc. He gives each selected plant an individual number and the following year a row is planted from the seed of each individual, the plants being uniformly spaced and uniformly fertilized. This is what is known as "plant to row" breeding. During that fall the breeder goes carefully over each plant on each row and discards entirely those rows which present visible bad characters. He then selects and picks a number of plants from the rows that are apparently best, to continue the pedigreed breeding. The seed cotton from each row is separately gathered, weighed, ginned and the seed from several of the highest yielding rows are next year increased in small separate fields. At the same time a row or rows of each new strain is put into a variety test alongside of many strains and varieties to test the comparative yields of each of the new strains. At the end of this year the variety test is gathered and then is estimated

the performance of each variety and strain and the strain of the new pedigreed cotton which makes the best quality and yield is, the following year, increased in a field. This will probably produce enough seed to plant 300 to 500 acres the fourth year after the beginning of the breeding work and the seed may then be offered in quantity. Thus is produced a pedigreed strain which has been proven by repeated tests to be the most superior of its generation and, if the breeder possesses the requisite knowledge and exercises proper care, the result will be a cotton of higher money value to the farmer and greater spinning value to the mill.

Such work as I have described has been going on for 20 years on our farms at Hartsville and has resulted in varieties which now occupy a large proportion of the staple acreage of the Mississippi and Arkansas delta regions and which are also planted to the extent of several hundred thousand acres in the Carolinas and Georgia.

Other breeders are operating along the same or different lines in the South. The splendid Pima cotton, now grown largely in the southwestern states, was developed by identical methods and other varieties of great value have been produced by government, state and private breeders.

It would seem that no serious difficulty would be experienced in securing the universal cooperation of both farmers and mills by those who are doing the best work in breeding and disseminating pedigreed strains of cotton, but unfortunately this is not the case. Cooperation has been secured from a large number of intelligent farmers and many enlightened spinners, but the great rank and file take no interest in the long continued efforts of the scientific cotton breeder, although his work has unconsciously to many of them benefited the industry to the extent of many millions. This lack of interest is due largely to the human tendency to stick to the ruts and not experiment with new methods or raw materials.

From the farmer's standpoint a large part of his lack of interest is due to the absence of sound and intelligent marketing methods in a great part of the South. I could cite a number of instances where farmers who have secured seed of desirable varieties of premium money value have promptly abandoned them because they could not get them properly ginned or could not sell them to advantage on their local markets. A proper policy of discrimination in buying by all cotton mills would largely cure this trouble. I am sorry to say that even today numbers of southern cotton mills buy cotton in their local or nearby markets at through prices. That is, they pay the same for all grades and staples as they come in. In many instances differences in grade but not in staple are made. When the time comes that every cotton mill and every cotton buyer shall recognize the patent fact that it is to his own interest and to the interest of the entire cotton industry that a proper discrimination should be made between cotton of each grade, staple, uniformity and character and that superior value should be reflected immediately into the pocket of the primary producer, a great improvement will be promptly seen in the entire cotton industry and profits will increase all along the line.

The records of our variety tests, extending back for many years and a nine-year table showing prices actually paid the farmers for different kinds of cotton on the streets of Hartsville, show that the planters of pedigreed strains of cotton of superior length have enjoyed far greater profits than those who stuck to unselected varieties.

I cannot refrain from calling your attention as good and progressive citizens to the importance of your promoting in every possible way everything that will improve the agriculture of this section. Agriculture is our basic industry. Without it our people would go naked and starve. A most alarming situation prevails. Let me quote from recent bulletins of the National Census Bureau: Total farm acreage in North Carolina was 22,439,000 acres in 1910. In 1920 it was 20,021,000 acres—a shrinkage of 2,400,000 acres. In South Carolina the figures are 13,512,000 and 12,461,000—a shrinkage of more than one million acres. In North Carolina there were about two and three quarter million less white farmers in 1920 than in 1910 and during this decade the shrinkage in South Carolina was about one and one-half million white farmers. There was some increase in colored farmers in the two states but not enough to offset one-quarter of the shrinkage in white farmers.

Is it not high time for every intelligent and patriotic citizen to wake up to the situation revealed by these census figures? This revelation of the decadence of agriculture in the eastern cotton belt is no surprise to me for I have been studying the economics of the situation for a long time and treated at length certain phases in my address before the recent World Cotton Conference. The part of that address which caused most comment was my estimate that, based on 10c for cotton, the average tenant family was making a revenue of 11c per day for each working member. It might not be inopportune to call attention to the fact that at the present time every industry in the United States is paying its labor many times as much as the cotton producing industry. In some industries, notably coal-mining and railroading, tremendous increases in wages have threatened to throttle the commercial life of the country by forcing high prices for coal and transportation and yet the poor cotton producer is forced to live on a pittance insufficient to furnish his family with a decent well balanced ration of food.

Let me say that I believe that the cure for this whole situation lies in the universal education of our people and especially in education for better methods of culture and fertilization of their crops and superior varieties of seeds which will produce larger crops with higher money value. The fruition of this educational work, however, must largely depend upon the attitude of the men who control the cotton manufacturing industry and particularly upon the mill superintendent. If you insist on cotton of the best character and uniformity of staple your treasurer will give it to you and his patronage of the man who is furnishing the best cotton will encourage greater efforts to improve the character and quality of the product of his district.

The teaching of the theories of improved agriculture will do little good unless accompanied by practical demonstration. By practical demonstration I mean the operation of commercial farms where the rank and file of the farmers may see with their own eyes that these theories *are* practical in operation and pay dividends. We have, I think, such farms in operation at Hartsville. Upon them are not only numerous demonstrations of plant breeding and variety and fertilizer testing but there are many large fields of staple cotton, now worth 70% to 100% premium over short cotton, which are about as fine as were ever grown

in that section, although the average yield of our county (Darlington) has been cut approximately two-thirds by wet weather, boll weevil and other causes. This striking illustration of the value of superior pedigreed varieties, of scientific farm management and correct methods of weevil control will do much to solve the most pressing agricultural problems of our section.

Let us all adopt a sympathetic and understanding attitude toward agriculture and irrespective of our immediate personal interest do all we can to support and encourage general education and the introduction of methods which will improve farm profits until they reach a figure that will allow our farmers and farm laborers a sufficient income to live in reasonable comfort.

Mr. Coker illustrated his remarks with some samples of different types of cotton. The exhibit of most interest to the mill men was an exhibit of samples of cotton which were taken from four stalks selected at random by Mr. Coker that morning in a field by the roadside while on his way to Charlotte from Gastonia. Samples were taken from the bottom bolls of these stalks and from the top bolls, and an examination showed that there was a great variance in the length of the cotton taken from the different positions on the same stalk. The bottom bolls seemed to produce the usual length, while the fibers taken from the top bolls were unusually short in length, in some cases where the bottom cotton was an inch and 11/16 inch in length the cotton from the top of the same stalk would be only ½ inch or so in length of staple. This was declared by Mr. Coker to be an indication that the staple of the cotton which the mills will receive from this year's crop will be very irregular and difficult to manufacture.

Following his address on cotton, Mr. Coker spoke briefly in defense of the action of the Federal Reserve Board. Mr. Coker is on the directorate of the Federal Reserve Bank of Richmond.

The Discussion on Cotton.

The discussion on Mr. Coker's paper was led by F. Gordon Cobb, chairman of the general sectional committee of the Association. In leading up to the discussion, Mr. Cobb said:

"In appointing the men to lead the discussions on these papers, the chairman of the program committee did not intend for those men to make a speech. His idea was gotten from our sectional meetings, and it was intended that we would give the members themselves an opportunity to bring out any questions that might be in their minds.

"I think we are very fortunate in having Mr. Coker with us this afternoon, and I want to suggest now that the chairman of our committee on carding, Mr. Dilling, make every effort to get Mr. Coker at our next sectional meeting of carders, so that we can go further into this important subject with him.

"The relation between the buyer of cotton from a commercial standpoint and the practical man who is to spin that cotton is not as close as it should be. In following Mr. Coker's address, I think there seems to be a wide gap between the mill cotton buyer and the practical man who is to use the cotton that the mill buyer purchases. Do not lose sight of the fact that these two people are looking at it from two entirely different standpoints. The commercial buyer is looking for a good trade, while the practical man is looking at that cotton entirely from a manufacturing standpoint, from the standpoint of whether he can get production out of his machines with it.

"I do not think there is any doubt but what there is a difference between the commercial grade of cotton and the grading of cotton for spinning purposes. I once visited Clemson College and to demonstrate or indicate this idea to the people there, I suggested to the director of that school that he select fifty samples of good middling cotton and fifty samples of middling cotton. Those samples were selected from a commercial standpoint.

"I took with me three practical mill men, one superintendent and two boss carders, men who were accustomed to looking at cotton from a manufacturer's viewpoint. These men did not know how this cotton had been graded.

"I asked these men to pick out of that one hundred bales of cotton the samples which they thought would spin the best, and to the great surprise of the director and the students, they picked out forty per cent of the middling cotton. That may sound absurd, but it is true.

"Now, what I would like to ask Mr. Coker is this: Is it possible for two samples of cotton, one graded as good middling and the other graded as middling, to have the same length and strength of staple?"

"That is a fact," replied Mr. Coker. "It is often the case."

"Then," questioned Mr. Cobb, "is it a fact that you can find a buyer of mill cotton buying middling cotton where the staple will be just as good as that classed as good middling?"

"Yes, sir," answered Mr. Coker.

"Then there is a difference in grading cotton," Mr. Cobb went on. "Then it is a fact that the mill treasurer and the mill cotton buyer would have to pay a higher price for cotton classed as good middling than for that classed as middling. Still, we have here the admission of an expert cotton man that the strength and staple of the middling might be better than that of the good middling. If this is the case, then there is 'good middling' cotton being purchased to manufacture goods when 'middling' cotton would be better for the purpose.

"These are the kind of things that the Southern Textile Association is trying to thrash out. We are trying to get the cotton buyer and the practical man closer together. We are trying to get the technical man and the practical man closer together. The trouble we have run up against most in securing data from the mills has been that the practical man does not know how to ask the technical man what he wants to know, and the technical man does not know how to tell the practical man what he does want. We are making some progress in the Southern Textile Association toward shortening this gap, for we have found that there is a great big gap between these two.

"I have found an instance that brings this thought out a little more forcibly. In some of the sections you will find a mill that is operating a ginnery away from a cotton market, and that ginnery will get all the cotton in that immediate section. I have found one instance where the mill was making a grade of print cloths that did not require a grade of cotton above middling. The customer was very well satisfied with the appearance of the cloth.

"In the first of the season the mill got all the good cotton. They asked a commercial cotton man to grade the

cotton for them. He graded some of it as fair, and some as good middling and above. So you see, gentlemen, it only brings out the other thought that there is a big gap between the cotton mill buyer—the treasurer or whoever he may be—and the practical man who is to spin that cotton. I think there seems to be plenty of food for thought.

"We hope to soon be able to get a man who can spend his whole time in making experiments in the mills. The trouble now is that when we ask a mill for information that requires the time of the superintendent and overseer, they cannot give us that time. 'They have their jobs to run.' We hope to soon get going with the Textile Foundation."

Mr. Johnstone stated that "it is altogether possible that we are getting the grades mixed up." A mill making print cloths, he indicated, makes that cloth of a certain weight, and would want a strict middling white cotton. Some times the people who buy the cotton do not have the necessary information. "If we want a middling cotton," said Mr. Johnstone, "then that could be specified in the contract. The responsibility comes back to us at the mill, but the grades of cotton are established by the government."

In reply to a question from Mr. Clark, Mr. Coker stated that his observations have shown that the first crop of cotton this season will be much better than the second crop.

"I would like to emphasize the point brought out by Mr. Coker," said Rogers W. Davis. "Some time ago I had to spend three days in a Texas town where the great bulk of the cotton was being sold right off the wagons. Not being particularly busy I watched them selling this cotton.

"I saw the American buyers pass up sample after sample because of the grade, and then the representatives of the English mills, who are recognized as the greatest spinners, stay behind the Americans, and bale after bale that the Americans had pushed aside the English would buy from the standpoint of staple and quality where the Americans had seen only the color and trash. You are losing because you do not make your buyers pay the same attention to these things that the English are paying."

"Is it not true," asked Clifton Corley, of Greenville, S. C., "that the kind of cotton a man needs depends to a great extent on the product of the mill? The English spinner usually spins very fine yarns and must have fine staple. If he can get staple, he doesn't have to have the other features."

Mr. Boyd brought out that it should be kept in mind that most print cloths are bleached, and that good cotton must be used in them as low grade stock leaves a grey stripe in the bleached goods. Asked for information in regard to this question, John W. Clark said he never had any experience with the inferior grades of cotton in his bleaching experience, as he had found that they will make bad work and had never troubled with it.

Entertainment Features.

At four o'clock on Friday afternoon, at the conclusion of the afternoon session, the visiting mill men were taken for an interesting automobile ride to points of interest in and around Charlotte, as the guests of the Charlotte entertainment committee. This ride terminated at the Auditorium building, where the delegates assembled at 6 o'clock for a chicken dinner, served on the "Dutch" plan, tickets having been secured at the morning meeting. The entertainment for this affair consisted of a four-piece orchestra which played popular selections and accompaniments for a musical comedy troupe procured from one of the Charlotte theatres.

The Saturday Morning Session.

The third and final session of the convention was held on Saturday morning, September 17. B. E. Geer, president of the Judson Mills, Greenville, S. C., who was scheduled to make the principal address at this session, was unable to attend, and when the meeting was called to order, President Johnstone asked Marshall Dilling, chairman of the sectional committee on carding, to render a report of that committee. Mr. Dilling read the recommendations which his committee had drawn up and which he presented at the annual meeting in Atlanta. These recommendations were published in the report of the Atlanta meeting in the June number of COTTON.

"At the Columbia meeting of carders," continued Mr. Dilling at the conclusion of this report, "we had considerable discussion on opening and ageing cotton. We spoke of the English system of cotton spinning, and how they can spin up to 40s with single roving, while we cannot do this. Their ability to do this is attributed largely to the fact that they have a different system of opening and mixing. As a result we would recommend the importance of opening and ageing the cotton after the English system.

"On carding we had some interesting discussion on licker-in speeds and feed plate settings. On account of the variety of opinions expressed, we cannot make any definite recommendations in this connection, and we find that there is a great field for experiment here. In the questionnaire it has been very hard to come to any definite conclusions about speeds and settings.

"I want to urge that the members of the Association who are interested make experiments along this line. I feel that there is a great field for improvement.

"The discussion on drawing was mostly in regard to the merits of one and two processes. At the Charlotte meeting (reported in January COTTON) sentiment seemed in favor of one process while those at the Columbia meeting were, in the majority, in favor of two processes." Mr. Dilling explained that at the Charlotte meeting there was a plurality of representatives from combed yarn mills, and that these men would favor one process inasmuch as they can secure the other necessary doublings from their combers. "It is recommended," said Mr. Dilling, "that experiments along this line be continued."

"There were a number of other features discussed but these three were the most important. The opinions were so varied that I don't feel like making any definite recommendations at this time from the discussion and reports."

Discussion on Carding.

The meeting was then thrown open for general discussion on subjects relating to the card room, and the men, though they had seemed to be a little reticent in talking about the subjects of raw cotton and finished cloth, opened up when the opportunity came for discussion of problems inside the mill.

Mr. Cobb, in starting the discussion, announced that he was going to read the entire organization of a card room as handed him by a carder who had been making experiments along the lines of settings, speeds and drafts. "This carder has given a great deal of time and study to this subject," said Mr. Cobb, "and this information is given you for discussion.

"These are the settings of a mill on 1-inch cotton, making 24s and 30s warp and 40s filling."

Following is the organization of this mill as read by Mr. Cobb:

Opener.—Three-blade beater, set to ¼ of an inch, speed, 1160 r.p.m.; strokes per inch, 36.

Breaker picker.—Speed, 1400 r.p.m. Beater set to ½ inch; 25 beats to the inch; weight of one yard of lap, 16 ounces.

Intermediate picker.—Speed, 1150 r.p.m. Two-blade beater, set to ¼ inch; 52 beats to the inch; draft, 4.57; 14-ounce lap.

Finisher picker.—Carding (Kirschner) beater; speed, 1120 r.p.m.; set to 1 inch; 65 beats per inch; draft, 5.09; weight of one yard of lap, 11 ounces.

Cards.—45-inch card; 11 ounce lap from finisher picker; cylinder speed, 170 r.p.m.; draft of card, 85.25; weight of one yard of sliver, 54 grains; production in ten hours, 145 pounds.

First drawing.—Six ends into one; draft, 5.6; weight of sliver, 59 grains.

Second drawing.—Six ends into one; draft, 5.5; weight of one yard of sliver, 65 grains.

Slubbers.—12 x 6. .56 hank roving; draft, 5.5.

Intermediates.—10 x 5. 1.70 hank roving; draft, 5.5.

Speeders.—5 hank roving; draft, 5.96.

The question was asked from the audience as to whether this carder was using the same finisher hank roving on all his numbers—24s and 30s warp and 40s filling.

T. A. Sizemore, who is the superintendent of the plant where this organization is in use, stated that he uses 6.45 hank roving for the 40s filling but that on the 24s and 30s warp he uses the 5 hank roving, as stated.

In commenting upon the organization, Mr. Dilling said, "The slubber draft seems to be excessive. From the information I have gotten, around 4 is accepted as the best draft on slubbers. In the past few weeks I have re-arranged the drafts in my own mill and have increased the breaking strength from 12 to 15 per cent by changing numbers so that I could change the production on certain machines."

Mr. Sizemore was questioned as to the breaking strength of the yarn made with the organization in point, and replied that on the 30s it is 55 pounds.

Why Is the Breaking Strength Going Down?

At this point, Mr. Cobb brought up the question of the decrease which has occurred generally over the section in yarn breaking strengths. He said, "There is another question that recently we have sent out to quite a number of mills, to ask them to send some of their bobbins to some other mill to be tested for breaking strength, and then to test in their own mill some bobbins from another mill, and we find that during the last six months that even with mills using the same grade of cotton that the breaking strength has gone down very much. In fact, from a number of mills which we canvassed in the last two weeks we found that of all these mills there wasn't but one but that had lost five pounds on 30s warp. I know that three of these mills were using practically the same cotton and the reports had begun to go down and we canvassed these other mills to see if it was local conditions. We found that it was almost general that the breaking strength has gone down. That was before new cotton came in, and it has been a source of worry to know what has caused this. We have had unusual weather conditions, it is true, and we would like to know just what has caused this decrease in breaking strength."

"Dry weather," was a suggestion from the audience.

"But what does that matter," asked President Johnstone, "if the yarn is subjected to the proper atmospheric conditions before testing? And by all means and in fairness it should be all conditioned the same before the tests are made." He then called upon Mr. Gardner, of Charleston, to make a few remarks in this connection.

"I find that the best way to get results," replied Mr. Gardner, "is to make the breaking tests under uniform conditions. We even went so far as to build a conditioning room, where we have absolute control of the humidity and where the variation caused by varying atmospheric conditions is eliminated, and we can tell what enters into the breaking strength. I find that the same things that apply to cotton yarn hold good in testing asbestos yarn, and my break tests are all made under uniform conditions. I find that it gives you a better comparison, and by process of elimination you can determine the factors that affect the breaking strength." Mr. Gardner stated it has been some time since he has worked with cotton yarns, as they are manufacturing asbestos yarns only at the Charleston plant where he is superintendent.

Referring back to the organization read by Mr. Cobb, Mr. Sizemore said, "We made our organization for 40s filling, but we brought that up to about 38s and consequently our filling runs about 38s instead of 40s.

"As to the drafts on the different machines, we are a little out of balance. We are very short on roving machines. Therefore, it is necessary to make the roving a good deal heavier than we would like to. Our spinning draft is too long.

"In regard to the drop in breaking strength, I attribute this to the variation in the staple. We try to buy our cotton around an inch to an inch and a sixteenth, but we have more 15/16 than 1 1/16. We find it very difficult to make an even and a smooth yarn with our long draft and variation in staple."

"As Mr. Sizemore has explained," brought out Mr. Cobb, "he is a little short on preparatory machines, and therefore he has to make a little heavier roving than he would like to. Still there are other mills in that same fix, and this is information for them, for this organization is in a mill short of preparatory machinery and it is doing good work.

"His breaking strength of 55 pounds on 30s is, I would say, a little better than the average. Since coming to the meeting I have asked several men about their breaking strength and with the exception of one mill, every man has said his breaking strength has gone down, and that occurred before getting in any new cotton. I was trying to find out whether this was because of weather conditions."

In this connection, J. V. McCombs, of Buffalo, S. C., brought out the following suggestions:

"I observed a short time ago that we were having a little trouble with breaking strength, and I believe the general conditions are about the same in regard to rain. This has been a very dry season. I am running three teeth slacker tension on the fly frames than I was running ninety days ago. I found that when I regulated the tension there

was very little difference in the breaking strength. I think that is where the trouble is with the breaking strength. There has been a difference in natural humidity conditions. I found that my fine frames would stretch the roving, so I make the roving with three teeth less tension."

Mr. Cobb asked if there were others who would make suggestions in regard to Mr. Sizemore's organization.

"In regard to this question of drafts," responded C. H. Strickland, "it is very important in reference to breaking strength. It is possible that if that mill was making a 12½-ounce lap some of his trouble might be eliminated.

"I think one of our greatest troubles is the lack of preparatory machinery and cards, and I believe most of us card too heavy. On 30s we should not card more than 125 pounds a day. The drafts on the slubbers, I find I can get the best results with 4 or 5, with a draft of 5 on the intermediates and from 5.75 to 6 on the speeders."

Continuing this discussion of the lack of preparatory machinery, Mr. Cobb declared, "There is an idea that has developed from our sectional meetings, and that is that it is a proven fact that the majority of mills throughout the South complain of not having enough cards. I believe Mr. Dilling will bear me out on this."

"Yes, that is true," said Mr. Dilling, "and this same fact was forcibly impressed in the questionnaires.

"We heard Mr. Coker with a great deal of interest in regard to the cotton crop this year and the influence it will have on the running of our work," continued Mr. Dilling. "I think the majority of the mills in the South have humidifying equipment, but so many of them have equipment that is not adequate. Under ordinary conditions, we can make these humidifying equipments answer the purpose, but with the unusual conditions such as we have had during the past several weeks, we cannot make them do right.

"I haven't noticed any difference in the breaking strength of our yarn, but I have a very good system of humidifying. I don't believe I would know where to put in another humidifier if I had to, I have so many now."

"That is one of the facts brought out in the questionnaires," added Mr. Cobb. He said that in the mills built ten years ago and previously is where the greatest trouble is being experienced.

The question of light, quick carding was the next to come up, together with means for reducing the pro rata production of the card. Mr. Cobb pointed out that some mills were fortunate in having additional space where they could install extra cards, and that others were having posts removed and beams put in so that additional cards could be put in, but that the big majority were having to accomplish it with the equipment already in use.

"They have accomplished this in different ways," he pointed out. "Some run the cards through the noon hour, others put on an extra night force and run the cards at night, in order to reduce the production per hour per card. They claim more breaking strength and better running work, especially in the spinning room. If anyone here has been able to reduce the per card production from, say, 140 to 100 pounds a day and still has been able to keep the mill running, we would like to hear from them."

H. D. Townsend, Lexington, N. C., said that they put in additional cards, and that where they had been carding 130 pounds they reduced the daily production to 100 pounds. He added that the results were good.

"I cut the card production from 180 to 135 pounds," said Mr. McCombs, "reducing the sliver from 68 to 52, and shortened up the draft from 15 to 20 per cent all through the mill. By pushing the cards through the noon hour and running twenty cards more at night than we did last year, we have increased the production 25,000 pounds a week over last year, and reduced the spinning at night 15 per cent. I try not to let my cards stop at the noon hour, and find that the increased efficiency takes care of the decreased production per card."

"Up to a year ago," Mr. Strickland remarked, "we ran the weaving through the dinner hour, but now we have stopped them during dinner, and have decreased the production in the card room. Also, instead of stopping off on Saturday in the card room we run right on through and that has helped us."

Discussion on Spinning.

The discussion of carding subjects was brought to a close at this point, and the chairman turned the meeting over to Carl R. Harris, chairman of the sectional committee on spinning, for a discussion on spinning room problems.

In starting the discussion, Mr. Harris said:

"As we have not had a sectional meeting of the spinners since the Atlanta meeting I was not expecting to be called upon to take a very active part in the program at this time. But on being informed that we would be allowed some time for discussions on spinning, I wrote a number of men requesting that they send me a list of a few things which they would like to have brought up at this meeting—and right here I would like to thank them for the hearty cooperation given.

"Some of the men misunderstood me to mean that we were holding the sectional meeting at this time, which is not the case. There will be a meeting held some time later.

"Owing to the limited time that we are going to have this morning, I do not think it best for us to try and take up any new matter, but rather go into a fuller discussion of several important things that were brought up at the Atlanta meeting and left unfinished, and then at the sectional meeting bring up these other things for consideration.

"A good many of the questions which I received were on things that we have had up before, such as: No. 1 flange ring, spindle speed, weight of spinning bands, overhauling, etc. But one of the most noteworthy facts and one that shows that we are making progress is that a good many of these questions show that this association is gradually being looked to for help in solving individual problems.

"One man made a suggestion that I think is very good. Instead of confining so much of our time to discussions dealing with the merits and demerits of various kinds of equipment, we should first thrash out uniform methods of efficient work on our present, or any equipment. As he says—'Any one can make time with a Pierce-Arrow. What we should endeavor to do is to help the man who has to drive a John Henry.' Of course there is an exception to this, in the case where a mill is contemplating putting in new equipment and asks for information. I think it is the duty of this Association to render all possible aid, and we have a case of that kind which will be brought up this morning.

"Before going into the discussion, I wish to state that a list of questions which will be brought up at the next sectional meeting will be published. And I would like for

every man here, and by all means every spinner, to familiarize himself with them and come to the meeting loaded with information.

"I have an inquiry as follows: 'I would be very much interested in hearing the ideal spinning frame for No. 15s yarn taken up, as we are contemplating putting in some frames. And I would like to hear from some of the fellows as to the best traverse length, size of ring, ring flange space and number of spindles per side.'

"I would like to have any of the men who have had experience in this kind of work to make some recommendations as to the spinning frame to use on this kind of work," said Mr. Harris.

The following specifications were suggested by Mr. McCombs, of Buffalo, S. C., for the kind of work in question: "224 spindles to the frame; 3½-inch gauge; No. 1 flange with 2-inch ring; tape drive; clutch spindles; eight-inch cylinder; 14-inch pulley; solid rolls in back, shell rolls in front; seven-inch traverse; speed about 160 r.p.m."

Mr. Harris questioned the necessity for clutch spindles on this type of work, and J. E. Hand, of Savannah, Ga., added that he would prefer plain spindles, as it would not be necessary to use the clutch spindles, he declared, the speed was pretty high, he admitted, but said that doesn't interfere with the spindles.

A 2½-inch ring and a 8½-inch traverse was also recommended.

Mr. Whiteside, who stated that he is making hosiery yarns, 12s to 22s, stated that there could be some discussion on the size of the ring. He said that he could take a smaller ring and get more speed. It was pointed out that the advantage of the larger ring was that more yarn can be gotten on the bobbins. "On medium counts," he said, "I would prefer a 1¾-inch ring, but on the 15s I would like about a 2-inch ring with an eight-inch spindle. I prefer tape drive on spindles, and also am in favor of the clutch spindles."

As supplementing the information he had given in regard to an ideal spinning frame for this work, Mr. McCombs said he would like to add that the cylinder should be in three sections, and that the draft gear, if possible, and the crown gear, should be of 16 pitch and not 24.

The chairman called upon W. H. Porcher, of the Whitin Machine Works, for his recommendations in connection with the case in point. Mr. Porcher stated that it would depend on the kind of work being run, and on being told that it was warp yarn, his recommendations were: 2-inch ring, 7-inch traverse, tape drive, and a frame 39 inches wide.

"At the Atlanta meeting," continued Mr. Harris in taking up the discussion again, "we found quite a varied opinion as to the care of idler pulley bearings on the tape drive. Mr. Dilling was asking for information and I would like to ask him if since that time he has found out any more on this subject?"

In replying to this request, Mr. Dilling said, "I asked about this at that time because I was having trouble with the idlers, but I think I have overcome that now. I have taken out the wooden flanges and soaked them in kerosene to clean out the grease, and since I have put them back in I have had no more trouble."

Mr. McCombs said he had the same trouble as Mr. Dilling and had found the same remedy. He added, "I got in enough extra flanges for four frames, and now I soak the flanges, four flanges at a time. You will find, Mr. Dilling, that you should soak your flanges about twice a year."

"That is a point that was brought up at one of our sectional meetings," said Mr. Cobb. "We have a mill with tape drive but do not have any trouble with these bearings, and I find another mill of 59,000 spindles where the overseer reports they have had no trouble. However, we found another mill who has had trouble. There is something for us to learn. We would like for anyone else who has had any experience along this line to let us know about it, whether you have had any trouble or not."

Mr. Wingate, of Gastonia, said, 'We have been running 20,000 spindles on tape drive about two years and have had no trouble. Could it be possible that different kinds of wood are used in these bearings?"

"Mr. Johnstone stated at the Atlanta meeting that with the tape drive you could run less spindle speed than with a band drive," said Mr. Harris. "This would mean a saving in several ways, and as we did not get to go into this very much at that time, I think it is well worth our time to get more information along this line."

In reply to a request from the chairman for further information, Mr. Johnstone said, "With the tape drive you have equal tension, with the band drive you must have the proper spindle speed on the slackest bands, which makes them run uneven. You must run the spindles a good deal slower to get the twist you think you are putting in."

The atmosphere also plays an important part in reference to the tension on band drives, Mr. Johnstone explained. In dry weather they will run slack, and in wet weather they will tighten up.

"Has anyone installed tape drives where they have been running bands and been able to decrease?" asked Mr. Harris.

"We have a room with both kinds in it, so that we can get a very good comparison. We are spinning fine numbers in this room. I use a 2-inch ring with almost hosiery twist on an eight-inch traverse with the tape drive, and on the band-driven frames we use a 1¾ ring. The front roll speed is two turns faster with the two-inch ring than with the 1¾. We have tried experimenting with the bands both ways, but cannot get the results. There are ends continually dropping down from slack bands. Our difficulty is that we have to run our frames slower on the band-driven frames. I have 1½ turns of twist more on the band-driven frames than on those with the tape drive." This statement was from Mr. Johnstone.

The Life of Tape.

"The question of the life of tape and bands, and the proper means of fastening the tape to prolong its service, received quite a little attention," said Mr. Harris, "but there seems to be no ready information on this matter. We would like to have more discussion on this. How many can tell us how long a tape and a band will last?"

After considerable experimenting, responded Mr. Brigman, of Lancaster, he has found the average life of tape to be about eight months. He added that he had found the average use of bands was about 4½ bands per spindle a year.

In considering which type of tape is the best, Mr. McCombs said, "There are so many different makes of tape on the market. I have used the basket weave and the herring-bone. I find that the herring-bone, which is made of

long staple cotton, will last longer, I imagine they will last about eighteen months. But the basket weave is made of medium length cotton, and will not last over four or five months. I think the life of tape depends on the kind of cotton it is made of."

"There is another thing I would like to say about the life of a tape," Mr. Johnstone added, "and that is, when you take a tape off it is not necessarily worn out. Sew them together and they will last as long again. I believe a tape will last for three years if you do this. Make one out of two, or two out of three, and you will get eighteen months more service with the plain weave, which has a green stripe down the center. It doesn't stretch and get up on the whorl of the spindle. We have not had the least trouble." Mr. Johnstone was questioned as to the make of this tape, but declared that he would not, in line with the policy previously adopted by the Association, divulge the brand, as every manufacturer had his own tape to sell and had his own especial selling points.

"For your further information along this line," stated Mr. Cobb, "I will state that at the first meeting we started an investigation about tapes, and we found that the tapes will not wear out so quickly, but that they will come loose at the lap, practically the same as a band comes loose at the knot, and we now have some mills experimenting with different kinds of thread to use in sewing the tapes together. So far we have found that the use of a linen thread in sewing the laps will make the tape last longer. And that is another point I would like to bring out, if any of you find a thread that will last longer, let us know about it so we can pass it on to the other members."

"I might say," contributed Mr. Johnstone, "that the thread that is in the shuttle of the sewing machine is the one that usually wears out. If you use a stronger thread in the shuttle than in the needle, you will not have so much trouble. I would recommend that this thread be about one-ply stronger."

Mr. Brigman asked, if a mill were to replace the rings on their frames, what would be the recommendation, No. 1 or No. 2 rings.

The No. 1 ring was recommended by Mr. Harris, whereupon Mr. Brigman asked "What are the advantages of the No. 1 flange ring?"

"As a partial answer to that question," replied Mr. Cobb, "the information we have from the questionnaire and sectional meetings has been that in using a No. 1 flange ring you get 1/16 of an inch smaller inside diameter. In other words, you can get a smaller ring and that has a tendency to make it run better."

Mr. Johnstone stated that he was an advocate for big rings. He said he would recommend a 2¼-inch ring on 15s yarn. A larger ring, he explained, will allow a greater quantity of yarn to be put on a bobbin, and less ends will be down on doffing.

Following this discussion on rings, the meeting went into business session, but there was no new or unfinished business to be transacted, with the exception of the place of the next semi-annual meeting, and on motion this was left to the decision of the Board of Governors. Following some few announcements, the convention was declared adjourned.

Real happiness is cheap enough; yet how dearly we pay for its counterfeit.

Opportunity Knocks.

Persons interested in establishing a manufacturing plant and desiring to secure a site with a village already equipped with housing facilities and buildings for mercantile establishments constructed and ready for use, will no doubt find the town of Longville, La., an attractive proposition. This town was built in 1907 by the Long-Bell Lumber Company, of Kansas City, Mo., to be utilized in connection with the lumber manufacturing plant of the company. However, this lumber mill was recently destroyed by fire, and the entire town is offered as a site for prospective manufacturers.

Longville contains three hundred modern employees' houses, fronting on graded streets set with shade trees. An ample supply of water is obtainable from both deep and shallow wells. The village is equipped with a new brick and stone bank building, a three-story hotel, an electric light plant and water works, a large general merchandise store building, meat market, stable and garage, etc. There is also suitable motor fire apparatus, a community church building, post office and telephone connections and office.

The town is located on the Lake Charles & Northern Ry., a subsidiary of the Southern Pacific System, and is 15 miles from De Ridder, which is a junction point for the Sante Fe, Kansas City Southern, and L. C. & N. Rys. It is 110 miles from Houston, 167 miles from Galveston, 149 miles from Shreveport and 245 miles from New Orleans.

With a complete village ready for occupancy, and with convenient railroad connections, this site will undoubtedly prove a good opportunity for a textile manufacturer contemplating the establishment of a mill in the center of a well known cotton section, and desiring to have suitable housing facilities for employees and buildings for mercantile establishments already constructed and available at a moderate price.

The Man Next to the Men.

At the recent industrial conference at Blue Ridge, North Carolina, Charles R. Towson, senior secretary of the industrial department of the Y. M. C. A., epitomized the labor contact, which Mr. Burton discussed at length in the September number, in the following words:

"The spirit of the workers is industry's greatest asset or liability. Muscle power and mind power are tremendous factors, but the supreme factor is heart power.

"To the thoughtful foreman it will be apparent that today the greatest thing in industry is not machinery or material or markets, but men, and that the greatest thing in men is not body or mind, but spirit; that while wages, hours and conditions—things material—may and must be temporarily adjusted, those unseen things that affect permanently the spirit of men—attitudes, motives and relationships—must be converted; that human wisdom may be equal to adjusting wages, hours and conditions—things material—but superhuman power alone can convert attitudes, motives and relationships—things spiritual. To help realize this in our own nation is a part of the task and privilege of foremen. To help to make it world-wide is the greatest achievement in which the Man next to the Men in American industry may have a part."

International Textile Exposition

Three hundred and eighty-seven exhibitors have taken space in the International Textile Exposition to be held in Mechanics Building, Boston, October 31st to November 5th.

This, the seventh exhibition conducted by the textile industry, will be by far the greatest Show of its kind ever held in this country. All the available 125,000 square feet of floor space of the two floors and balconies in Exhibition and Grand Hall is sold—and it has been found necessary to use Paul Revere Hall.

The coming Exposition, with twice the number of exhibitors, will be more complete in every detail than any previous show. The unprecedented number of machines to be exhibited in actual operation will be of great value to manufacturers and very attractive to the general public.

Starting with the picker room equipment, there will be hardly any machine of importance—used in a cotton mill—that cannot be seen in actual operation—including dyeing, finishing, and cloth room equipment.

Another feature of importance will be the Power Department which will occupy Department D, and will include

President E. F. Hathaway of the Textile Exhibitors Association.

exhibitors of everything that is new and important in the transmission of power in a textile mill.

There will be in addition, the usual exhibits of products allied to the textile trade and for the first time, the finished product will be exhibited by many of the largest mills in the country.

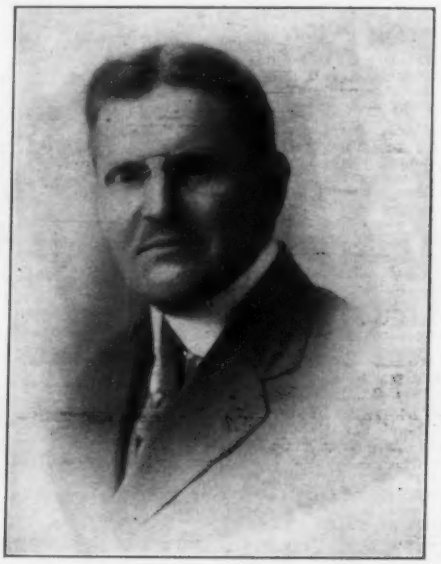
During the week there will be two big national conventions held in connection with the Exposition at which the vital questions of the industry will be discussed.

The most important will be that of the National Association of Cotton Manufacturers to which delegates from every mill center in the United States, Canada, and in a number of instances, England, will journey to Boston, and the New England Association of Commercial Engineers, who have devoted their energies to promoting the Power Show, will convene in Boston during the Exposition.

The officers of the Textile Exhibitors Association are President, E. F. Hathaway, Vice-President, F. J. Hale, Treasurer and Secretary, Chester I. Campbell.

The exhibition, as in previous years, is under the personal direction of Chester I. Campbell, 5 Park Square, Boston, Mass.

Among the hundreds of exhibits there will be many machines and devices incorporating many new improvements



Chester I. Campbell, Manager, International Textile Exposition.

made since the last Exposition. A perusal of the list of exhibitors will give the reader an idea of the representative companes and the character of the exhibits. The numbers at the left indicate the exhibit space numbers in the Mechanics Building where the exhibit may be found.

87—Abington Textile Mach. Trustees.
609-611 inc.—Adirondack Woolen Co.
529—Allen Company.
211—Allis-Chalmers Mfg. Co.
251—Alsatian Machine Works, Ltd.
70—American Hard Rubber Co.
243, 250—American Kron Scale Co.
25, 31—American Moistening Co.
608—American Oil Company.
302—American Steam Gauge & Valve Mfg. Co.
42—American Tool & Machine Co.
21—American Wool & Cotton Reporter.
650—American Wringer Co., The
384—Anderson & Co., G. P.
363—Anderson Co., V. D., The
55—Arlington Machine Works, Arthur Birch.
335—Ashton Valve Co., The
521—Atlas Plywood Corp.
251—Atkingson, Haserick & Co.
209 A, 210—Automatic Transportation Co., The
208—Bahnson Company, The
50, 51, 52, 56, 57, 58—Barber-Colman Co.
19B—Barnes Co., Wallace.
609-611 inc.—Barnet & Son, Wm.
609-611 inc.—Barnet Woolen Mills, Isaac.
609-611 inc.—Basch & Greenfield Co., The
113, 114—Birch Bros.
355—Blackmer Rotary Pump Co.
93—Borne, Scrymser Co.
20—Bradford Oil Company, Inc.
112—Bragdon, Lord & Nagle Co.

301—Brinckerhoff Co., H. Gordon
548, 549—Brown Mfg. Co., Arthur S.
710-724 inc.—Bureau of Foreign & Domestic Commerce.
100, 101—H. W. Butterworth & Sons Co.
225—Baker R. & L. Co.
330—Braman, Dow & Co.
103AA—Burkhardt Brewing Co.

606—Canadian Textile Journal.
43, 49—Carrier Engineering Corp.
77, 79 inc.—Carter Company, The William
36—Cash Company, A. W.
345—Cashin & Co., W. D.
246—Cling Surface Co.
204—Clipper Belt Lacer Co.
338—Cochrane Steam Specialty Co. of Mass.
609-611 inc.—Cohoes Fibre Reclaiming Co.
339, 340, 346, 347—Coppus Engineering & Equipment Co.
616, 617—Commission of Foreign & Domestic Commerce.

542—Cook-Taylor Co., Inc.
312—Calebaugh Self-Lubricating Carbon Co.
609-611 inc.—Cordingley & Son, W. S.
22—Cork Insert Co., The
213—Cresson-Morris.
516, 517—Crew Levick Company.
120-125 inc.—Crompton-Knowles Loom Works.
90—Curtis & Marble Machine Co.

632—Daily News Record.
155-162 inc.—Davis & Furber Machine Co., R. S. Rockwell.
68—Davis Mfg. Co., Frank.
367—Davidson, M. T.
327 AA—Dearborn Chemical Company.
633, 634—Detroit Graphite Co.
36—Dodge Sales & Engineering Co.
137-144 inc.—Draper Corporation, W. I. Stimpson.
84—Dupont de Nemours & Co., E. I.

166-171 inc.—Easton & Burnham Machine Co.
614, 615—Eclipse Textile Devices Co.
212—Economy Engineering Co.
220—Edison Storage Battery Supply Co.
311—Efficiency Engineering Co.
333—Eggleston Storage Battery Co.
209B—Electric Supply Co.
609-611 inc.—Extract Wool & Merino Co., The

525, 526—Fafnir Bearing Co.
166-171 inc.—Fales & Jenks Machine Co.
332 AA—Federal Gauge Co., The
376, 383—Files Engineering Co., Inc., The
630—Ford Co., J. B.
370—Foster Engineering Co.
150—Foster Machine Co.
329—Foxboro Co., Inc., The
361—France Packing Co.
360—Files Steam Specialty Co.

304—Garlock Packing Co., The
89—General Electric Co.
609-611 inc.—Gray & Co., T. H.
174—Greist Mfg. Co., The
626—Gallaudet Aircraft Corp.

534—Haire Publishing Co., The
643—Hampden Paint & Chemical Co.
393—Harris Oil Co., A. W.
165, 172—Hetherington & Sons, John, Ltd.
609-611 inc.—Hey & Co., Benjamin
175—Hopedale Mfg. Co.
62, 63—Howard Bros. Mfg. Co.
334—Howes, C. L.
646—Howes Publishing Co.
200, 201—Hyatt Roller Bearing Co.
53—Hussong Dyeing Machine Co.

212—Ideal Stencil Machine Co.
319, 320—Johns-Manville, Inc., of Mass.
152, 153, 154, 163, 164—Johnson & Bassett.

228, 231—Kaumagraph Co.
612—Keene Silk Fibre Mills.
625—Kenney Mfg. Co.
239—Keystone Lubricating Co.
353—King Refractories Co., Inc.
115, 116—Klauder-Weldon Dyeing Machine Co.
547—"Knit-Easy" Parrafin Attachment.

92 B—Lamson Co., The
641—La-Lo Chemical Corp.
629—Lambeth Rope Corp.
532—Lawrence Leather Co., A. C.
332—Lead Lined Iron Pipe Co.
648—Lewis Co., G. B.
45—Leyland Co., Inc., Thomas
86—Link Belt Co.
76—Lowe Supply Co., S. C.
25—Lyon Mfg. Co.

64—Macrodi Fibre Co.
397—Manning Maxwell & Moore, Inc.
602—Manufacturers Machine Co.
635—Markem Machine Co.
126-129 inc.—Mason Machine Works.
328—Mason Regulator Co.
651—Masury-Young Co.
353—McClave-Brooks Co.
65—McCloskey, John J.
394—McGraw-Hill Co., Inc.
85—Mercury Mfg. Co.
549—Myers, Jacob.
216—Mill News.
546—Mineral Soap Mfg. Co.
349—Monarch Soot Remover Co., Inc.
639—Morris & Co., Inc.
75—Morse Chain Co.
66—Mossberg Co., Frank.
88—Mossberg Pressed Steel Corp.

226, 227—Nash Engineering Co.
341, 342—Nashua Machine Co., Inc.
236—Nashua Steam Press & Boiler Works.
Entire Stage—National Aniline & Chemical Co., Inc.
609-611 inc.—National Association of Wool Fibre Mfrs.
53—National Flue Cleaner Co.
528, 551, 552, 553—National Research Council.
29—National Ring Traveler Co.
307—"National Engineer."
609-611 inc.—National Woolen Co., The
627—N. Y. & N. J. Lubricant Co.
609-611 inc.—Norfolk Woolen Co.
244—Northway Motor Sales Co.

628—Oakley Chemical Co.

228, 231—Park & Woolen Machine Co.
61, 67—Parks-Cramer Co.
305—Perfection Grate & Supply Co.
83—Permutit Co., The
318—Petroleum Heat & Power Co.
102, 103—Philadelphia Drying Machine Co.
303—The Philadelphia Grease Mfg. Co.
326, 327—Portable Machinery Co., Inc.
366—Power Equipment Co.
326 AA—"Power Plant Engineering."
344—Pratt & Cady Company, Inc.
356—Quigley Furnace Specialties Co., Inc.

603—Raymond Agency, Inc., Charles P.
223—Refinite Co., The
218—Reynolds Co., Inc., Thomas L.
230, 233—R. I. Warp Stop Equipment Co.
315—Robinson, John R.
18—Rogers Fibre Co.
19 A—Root Co., The
354—Roto Co., The
321—Ruggles-Klingemann Mfg. Co.

149AA, 150, 151—Saco-Lowell Shops.
207—Sarco Co., Inc.
543—Schmitz & Guild, Inc.
71, 72—Scott & Co., Henry L.
119—Scott & Williams, Inc.
117A—Sowers & Co., Inc.
37, 48—Shawmut Engineering Co.
604—Signode System, Inc.
631—Silk Publishing Co.
39—S. K. F. Industries, Inc.
609-611 inc.—Slack Co., John T.
538—Solvay Process Co.
609-611 inc.—Smith & Cooley.
241, 242, 247, 248, 249—Smith & Furbush Machine Co.
332—Smith Engineering & Supply Co.
16—Smith Publishing Co., W. R. C.
609-611 inc.—South Action Woolen Co.
377—South Bend Lath Works.
536—Southern Novelty Co.
647—Southern Textile Bulletin, The
624—Sowers Mfg. Co.
609-611 inc.—Spink, William.
105-110 inc.—Stafford Co., The
229, 232—Standard Conveyor Co., The
35—Standard Fibre Co.
601—Standard Foundry Co.
537—Starkweather Co., J. U.
368—Starkweather & Broadhurst, Inc.
111—Steel Heddle Mfg. Co.
17—Stein-Hall & Co., Inc.
609-611 inc.—Stoughton Mills.
212—Stuebing Truck Co.
609-611 inc.—Sullivan Co., R. T.
364—Superheater Co., The
73, 74—Suter, Alfred.
80, 81—Tagliabue Mfg. Co., C. J.
621—Talcott, Inc., W. O. & M. W.
609-611 inc.—Taunton Wool Stock Co.
369—Taylor Instrument Co.
609-611 inc.—Taylor-Lockwood Co.
91—Textile American, The
534—Textiles.
642—Textile Colorist, The
118—Textile Finishing Mach. Co., The
24, 30—Toledo Scale Co.
38, 44—Tracy Co., Lewis E.
214, 215—Transmission Ball Bearing Co.

208—U. S Air Compressor Co.
92A—U. S. Gutta Percha Paint Co.
202—U. S. Hoffman Sales Co.
59—U. S. Bobbin & Shuttle Co.
174—U. S. Ring Traveler Co.
26, 27, 28, 33, 34—Universal Winding Co.

359—Valve Engineering Co., The
82—Veeder Mfg. Co., The
252—Voelker & Co., G. W.

104—Wade Publishing Company.
613—Wadsworth, Howland & Co., Inc.
365—Wallace & Co., J. D.
351—Walworth Manufacturing Co.
245—Watkins Engineering Supply Co.
607—Westaway Company, W. J.
40, 46—Westinghouse Electric & Mfg. Co.
164AA—Westinghouse Lamp Co.
132-136 inc., 145-149 inc.—Whitin Machine Works
609-611 inc.—Whittaker & Bacon.
336—Widger & Miller Co.
60—Williams Co., The J. H.
609-611 inc.—Winchester Woolen Co., The
219—Woods Machine Co., S. A.
253—Woods Sons Co., T. B.
166-171 inc.—Woonsocket Machine & Press Co., Inc.
234, 235, 237, 238—Woonsocket Napping Machine Co.

The Design and Manufacture of Fustians

BY T. WOODHOUSE AND A. BRAND.

Although the type of plain back velveteen described in our last article is a very simple example, it forms, as it were, the base of a set, and illustrates, more or less fully, the general structure of velveteen fabrics and the principles involved in the manufacture of all similar textures. Better qualities have, undoubtedly, more complex structures, inasmuch as the ground weave employed, and the order adopted of stitching in the pile picks, are more complicated in nature than that already shown; nevertheless, no actual new principle is involved. Even in the manufacture of ribbed, corded, or hollow-cut velveteen —as this particular variety is variously termed—the rounded effect is produced by a special method of fustian cutting, and not by any special properties of the weave employed.

Probably the great majority of velveteen fabrics are woven with a twill back, and especially those in which a large number of picks is required. Again, there are many different schemes or orders of inserting the pile picks in regard to the ground picks, and different proportions of ground and pile picks obtain in the various structures. The point-paper designs for two twill-back fabrics are given at A and B, Fig. 7; in both cases the ground weave is

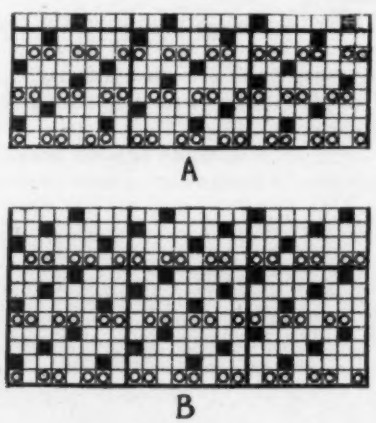


Fig. 7.

shown in circles and the pile picks in solid squares. The upper design A shows four repeats in the way of the warp, the unit weave being complete on 6 threads and 9 picks; it is capable of being woven with a straight draft on 6 harnesses, in which case the first six threads of the design would be used as a weaving plan. As indicated by the above-mentioned distinctive marks, there are two pile picks to one ground pick, and these are inserted in the following order:

1 pick of ground filling.
2 picks of pile filling.

The ground picks interweave with all the warp threads in the 2 up 1 down twill order, the direction of the twill being towards the right; this of course gives a left-hand filling twill on the back of the fabric, and hence the back filling offers a minimum amount of resistance to the movement of the fustian cutting knife.

The pile picks may again be regarded as 3 picks of the 1 up 5 down twill. The lower design B, Fig. 7, also shows four repeats in the way of the warp, the unit weave being complete on 6 threads and 12 picks. The filling is inserted in the following order:

1 pick of ground
3 picks of pile.

Apart from these differences, the weave is very similar to that given at A, and the same identification marks are used for the two kinds of filling.

Figure 8 is introduced in order to render the construction of the twill back fabric as clear as possible. The point-paper design at A, Fig. 7, is repeated on a somewhat larger scale at A, Fig. 8; the pile picks are again indicated in solid squares, while the ground picks are shown in circles. The picks are numbered 1 to 9 at the right-hand

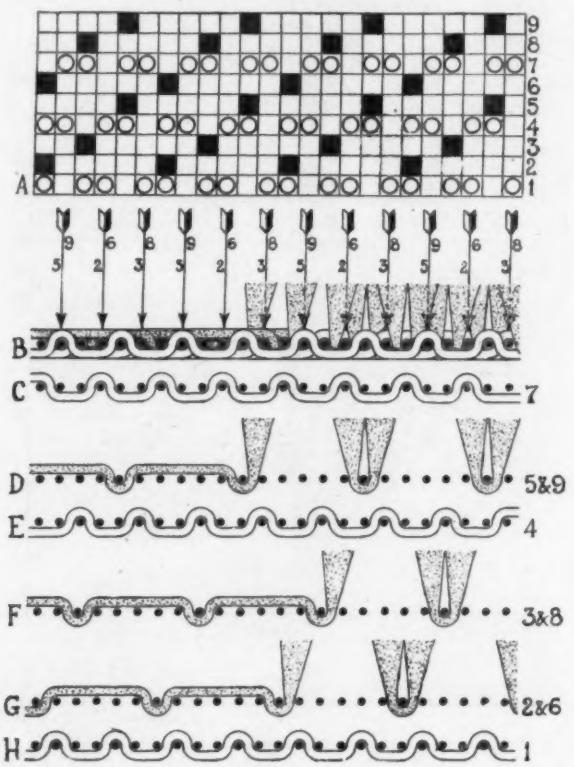


Fig. 8.

side; picks 1, 4 and 7 are ground picks, and the remainder are naturally the pile picks.

A transverse section through the warp threads is given at B, the view being drawn looking on pick No. 1 of the design A. The left-hand twelve threads of the section B are shown as they would appear with the filling in the woven condition or in the loom, while the right-hand half of the section demonstrates the change which is effected by the cutting knife. The individual picks, which go to compose the complete section B, are shown immediately below at C, D, E, F, G and H. It will be seen that there are only six different picks, although the full weave requires nine picks to complete one unit. The particular picks,

to which each of these individual sections refer, are numbered at the right-hand side to correspond with the numbers on the right-hand side of the design A. The arrows drawn between the design A and the section B show all the positions at which the floats of filling depicted in A are cut in order to form the velveteen pile. The numbers close to the arrows indicate upon which pick the particular float of filling is cut.

Figure 9 is a photographic reproduction of two samples of velveteen fabrics; they are similar in general appearance to those illustrated in Fig. 5, but are woven with a twill back. The fabrics are shown in two stages, viz., uncut on the left-hand half, and cut on the right-hand half, while a small portion at the bottom of each of the samples has been

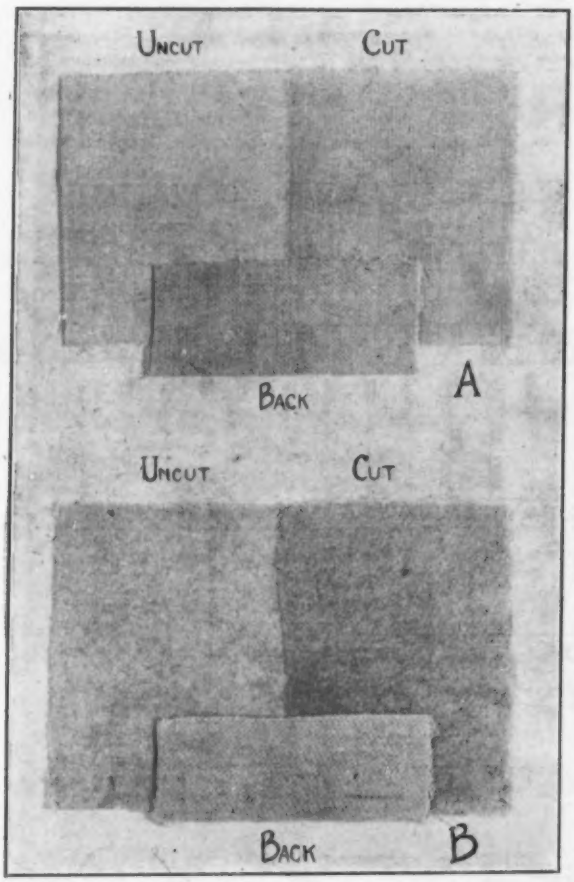


FIG. 9.

turned over in order to display the backs of the fabrics. The point-paper design for both of these fabrics appears at A, Fig. 10, where four repeats in the way of the warp are shown; the pile picks are again marked in solid squares and the ground picks in circles. The ground weave and the pile weave are shown separately and respectively at B and C in the same figure. It will be seen that the ground weave is similar to that already used in Figs. 7 and 8, viz., the 2 up 1 down twill to right, and that the pile picks also correspond exactly to those in Figs. 7 and 8. As in the case of the plain back fabric in Fig. 5, the marks on the pile picks do not constitute a weave in themselves, but merely indicate the various points at which the pile filling is bound into the ground or body of the fabric.

An examination of the pile picks at C, Fig. 10, will reveal the fact that although there are 12 pile picks in one unit or repeat of the weave, the 12 picks really constitute 4 sets, each set containing 3 different picks; there are only 3 different kinds of pile picks in the weave. The unit weave or repeat is complete on 6 threads and 15 picks; the comparatively large number of picks required in a unit is due to the weaves employed being complete on 3 picks, while the order of inserting the pile and ground filling is 4 of the former to 1 of the latter, or 5 in a group. A small but

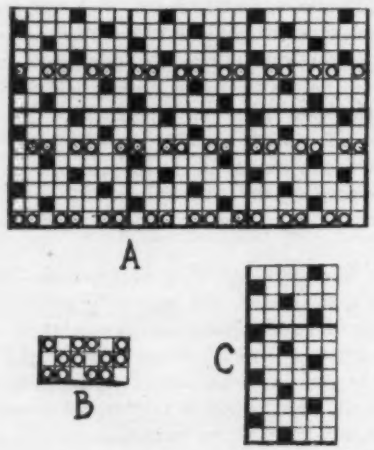


FIG. 10.

important point in the design may be noticed at this stage; the 2 up 1 down twill is employed as the ground weave which is of the warp flush form, that is to say, there is a maximum of warp on the upper surface of the ground fabric, and a minimum of filling. There is thus, as already stated, less danger of penetrating into the ground fabric during the operation of fustian cutting than there would be

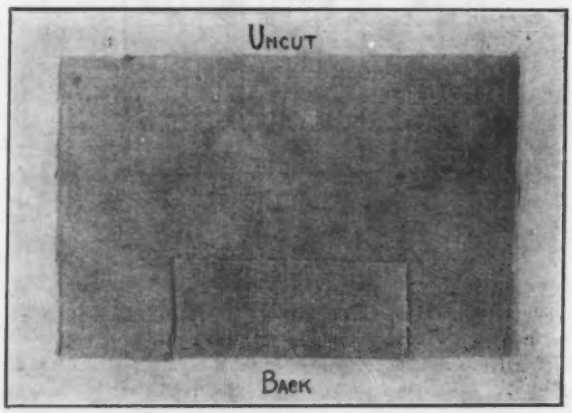


FIG. 11.

if the filling flush, 1 up 2 down twill, had been used.

As already indicated, both the upper and lower examples in Fig. 9 have identical structures; the sole difference between the two is one of weight or quality. The upper sample A is made with 88 threads per inch of 2/80s cotton warp, and 460 picks per inch of 50s single cotton filling; it weighs about 8¾ ozs. per square yard. The lower sample B is woven with 92 threads per inch of 36s single cotton warp, and has 420 picks per inch of 58s single cotton filling; it weighs fully 7¾ ozs. per square yard. It should

also be noted that sample A is shown with the filling in the horizontal, while in sample B the filling is vertical.

When the velveteens are somewhat light, as, for instance, sample B, Fig. 9, it becomes necessary to use more or less irregular orders of interlacing, such as that shown in design A, Fig. 10, in order to secure a uniform distribution of the pile tufts over the surface of the fabric, and to secure freedom from lined effects. This is accomplished in the case of samples A and B, Fig. 9, by employing a comparatively large number of picks to the round, viz., 15, and by using 3 picks to the round weaves in groups of 5 picks, i. e., 1 ground pick to 4 pile picks. It is not essential, however, that there should be 4 picks of pile filling to 1

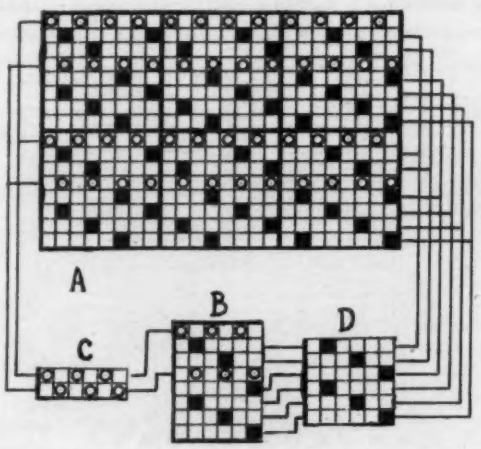


Fig. 12.

of ground to secure the desired results. It is an indubitable advantage on occasion to make use of less simple orders of inserting the two varieties of picks.

An example of variation in the order of inserting the ground and pile picks is given in Fig. 11, which is a photographic reproduction of a plain back velveteen; the view shows the fabric in the uncut condition only, and a small portion on the lower edge of the fabric has been folded over in order to give the general appearance of the back of the cloth. The structure of this particular sample is given in Fig. 12, where A shows four repeats of the design in the way of the warp, and two repeats in the way of the filling. The ground weave is again indicated by circles and that of the pile by solid squares. It will be seen that the unit weave is complete on 6 threads and 8 picks; the weaving plan is shown at B in the same figure. The weaving plan indicates that 6 harnesses would be necessary, that a straight draft could be employed, and that the shedding tappets or cams would be driven at a speed giving 8 picks to the round. The individual weaves are shown separately at C and D, Fig. 12; the fine lines are to show the connection between the individual weaves, the complete weave, and the weaving plan. It should be particularly noticed that the order of inserting the picks is as follows:

4 picks of pile filling
1 pick of ground filling
2 picks of pile filling
1 pick of ground filling.

The fabric is lighter than those exhibited in previous examples as the weight is only about 6¼ ozs. per square yard. The cloth is woven with 77 threads per inch of 54s single cotton warp and 268 picks per inch of 40s single cotton filling.

It has already been pointed out that in the finer classes of velveteen, where great security of the pile tufts is necessary or desired, recourse is had to one or both of two methods:

(1) Using a large number of picks per inch.
(2) Using a weave which gives a fast or lashed tuft, similar to that shown at B in Fig. 1.

There are many and varied forms of fast pile weaves, and Fig. 13 is given as a typical example. The desiyn at A in this figure exhibits four repeats of the unit weave in the way of the warp; the unit weave is complete on 10 threads and 12 picks, the latter being inserted in the order:

1 pick of ground filling,
5 picks of pile filling.

The weave necessitates the use of 6 harnesses, as indicated by the weaving plan B and the corresponding draft C.

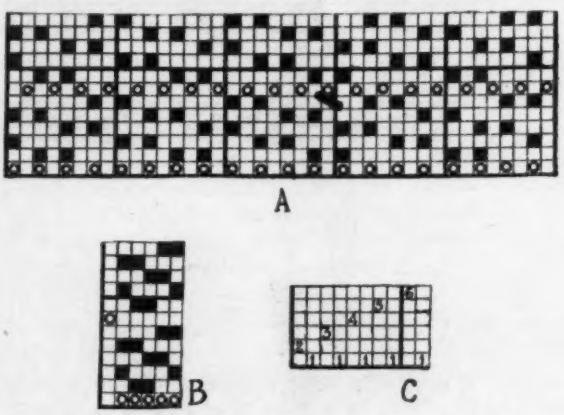


Fig. 13.

This particular weaving plan possesses the advantage that the first or front leaf actually carries one-half of the total number of warp threads, and this harness is in the position most accessible to the weaver for the purpose of repairing faults and breakages.

Figure 14 is a transverse section through the warp threads showing the interlacing of one of the pile picks, viz., the third pick or the 9th pick of the design counting from the bottom upwards. The left-hand group of twenty threads is shown uncut, while the corresponding right-hand group is shown as it would appear after the passage of the fustian knife. It will be observed that each pile tuft interweaves with, or is locked into position by three separate

Fig. 14.

and successive warp threads, thus forming one variety of the so-called lashed or fast pile. The vertical arrows in this figure indicate the position where each float of filling would be severed in order to form the pile tuft.

Ribbed or corded velveteens, in the loom or uncut condition, possess no structural features to distinguish them from ordinary velveteens; in fact, many of the ordinary velveteen weaves are used in the production of this special variety. The characteristic rounded or hollow-cut appearance of this class of velveteen is shown in Fig. 15 which is a photographic reproduction of a small sample of a dark blue ribbed velveteen. A small portion at the left-hand side is turned over to show the back of the fabric; the middle and largest portion is shown hollow-cut, while the narrow strip at the right-hand side, about 3/8 in. wide, is in the loom or uncut condition. The rounded effect is not an attribute of the weave used, but is the result of cutting the floats of filling in different positions in a series of successive races in order to produce pile tufts of unequal length. The pile tufts become J-shaped and the reverse with the long and short portions located contiguously rather than U-shaped as shown in Fig. 1, although some of the tufts are identical with the latter. The reason for this effect will be better understood after an examination of the way in which the various lengths or floats are cut.

Figure 16 illustrates diagrammatically the manufacture of corded or hollow-cut velveteens. In this figure, A is the point-paper design for a 10-pick to the round velveteen, woven with a plain back, and with four picks of pile filling to one pick of ground filling. Although 33 threads of

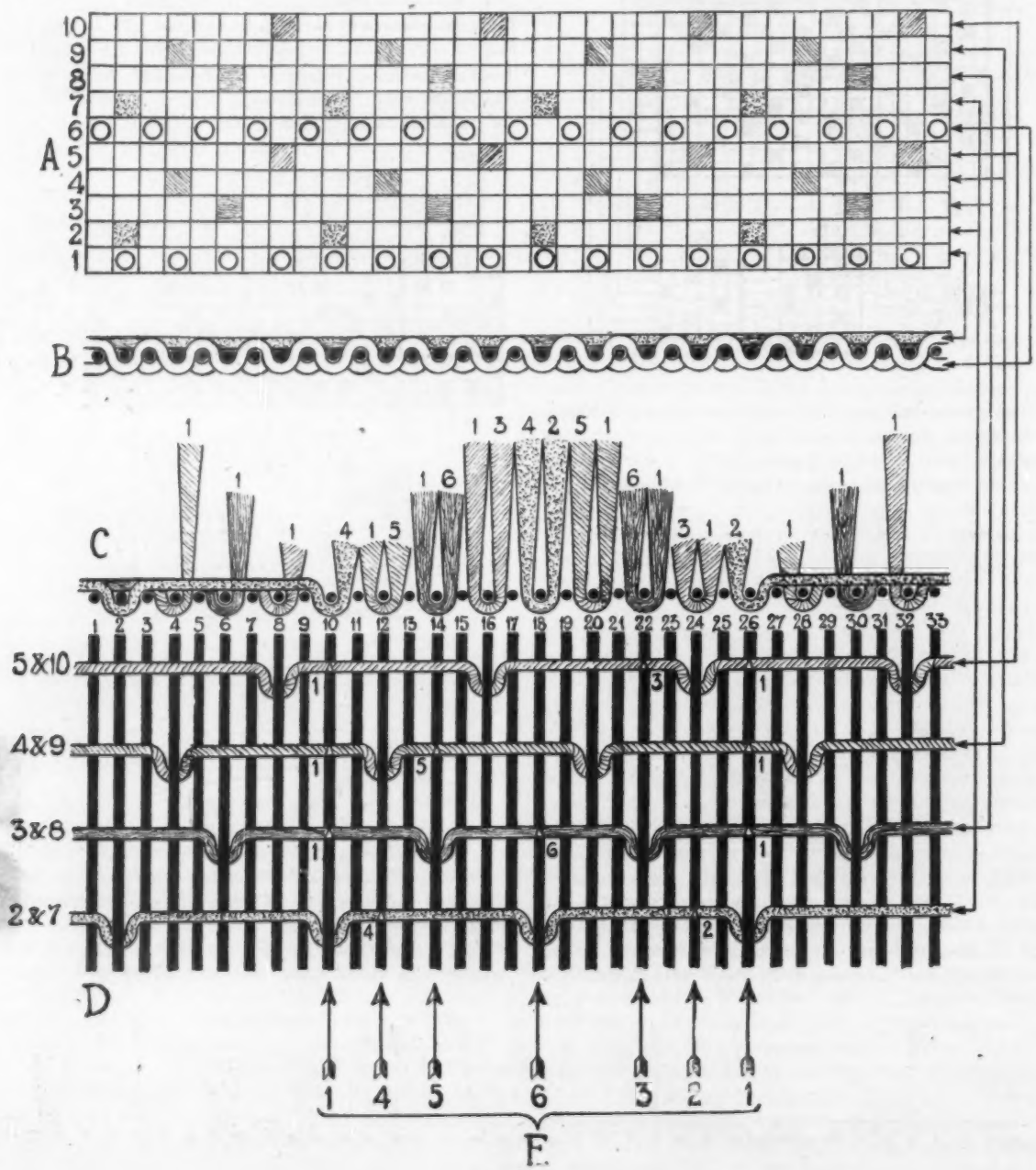


FIG. 16.

warp are shown, the unit weave is complete on 8 threads, and is capable of being drafted on 5 harnesses. If it were desired to have a straight draft, 8 harnesses would be required. This would, of course, save special harness knitting (unless wire healds were used) but 8 harnesses are not so easily controlled in the loom as 5.

As usual, the ground picks in the design A, Fig. 16, are indicated by circles, but, in order to render the cutting process more intelligible, distinctive marks have been employed for the four different pile picks.

A transverse section through the warp threads is given at B, showing the appearance of the fabric in the uncut condition. It should be observed that these two views, A and B, might equally well apply to an ordinary plain-back velveteen; as a matter of fact, the weave chosen is often used for the usual make of velveteen. In this trans-

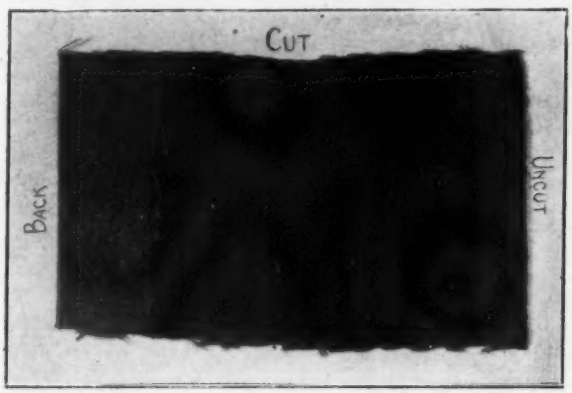


Fig. 15.

verse section B, as well as in the section C, and in the diagrammatic plan D, the warp is shown in solid black, the ground filling in white (not shown in plan D) and the pile filling is stippled, lined, etc., to correspond as far as possible to the kind of work used in the point-paper design A.

At D is given a distorted, or rather, a diagrammatic plan view of the 33 warp threads, interlaced with one each of the four different pile picks. The numbered arrows, bracketed at E, indicate part of the complete cutting plan. In cutting ordinary velveteen, the fustian cutter's knife is passed successively through the center of the various races, in regular order, severing each float of filling into two equal portions, and producing a field of pile tufts practically uniform in height. In the making of certain varieties of hollow-cut velveteen, the knife is passed through the various races in a more irregular, but still perfectly definite order, so as to sever some of the floats at the center to obtain U-shaped tufts, and to sever others nearer to one end, producing J-shaped and reverse J-shaped tufts. In the present instance, all of the tufts are of the simple or two-branched type, but, as stated, in several cases the two branches are of different lengths. The net effect is to produce rounded ribs of pile tufts running parallel to the warp threads; they are, indeed, very similar to those produced in the manufacture of corduroys. It should be understood that there is no particular order of cutting for any weave; the order of cutting and the weave itself are quite independent. Indeed, by varying the order of cutting, it is quite possible to produce ribs of different widths in the same fabric; this is occasionally done in the making of the more decorative fabrics.

The method of producing the pile tufts in the fabric illustrated in Fig. 15, is exemplified in Fig. 16, and is somewhat as follows: The fustian cutter's knife is inserted, say, at the right-hand arrow numbered 1 of the group E; it cuts three of the pile picks at the points indicated by an arrow head notch; these picks are also marked 1 near each notch. The float in pick No. 3 or No. 8 is severed at the center; the right-hand part bends about the thread numbered 30, and forms the corresponding medium-height tuft numbered 1 in the intersection C immediately above this warp thread. The left-hand part of the float bends about warp thread No. 22, and forms the medium-height tuft numbered 1 in intersection C immediately above this particular warp thread. Again, the float in pick No. 4 or No. 9 is cut into two unequal portions, the smaller part bends about warp thread No. 28, forming the minimum-height tuft 1, while the larger part bends about warp thread No. 20, and forms the maximum-height tuft 1. Similarly, the float in pick No. 5 or No. 10 is cut into two unequal portions; the larger portion bends about warp thread No. 32, resulting in a maximum-height tuft 1, and the smaller part bends about warp thread No. 4, yielding a minimum-height tuft 1.

This operation is repeated at the places indicated immediately above E by the arrows, and in the order numbered 2, 3, 4, 5 and 6; the final result is to obtain a group of tufts in the rounded formation illustrated. The cutting operation, repeated across the width of the fabric, gives to it the characteristic rounded, corded, or hollow-cut appearance. In such fabrics, the operation of cutting is almost invariably performed by hand, and it will be appreciated that the work of the fustian cutter on this variety of fabric calls for a large amount of manual skill.

(*To be continued.*)

The ever progressive Greenville, and by that we of course mean Greenville, South Carolina, has just added another star in its crown of achievements by starting the publication of a civic and commercial journal, to be known as "Greenville," and which is to be a monthly organ of the Chamber of Commerce, to record the important civic and commercial events of this live-wire community. The first issue is the September number, which contains 24 pages full of interesting information about Greenville and her activities. The leading article in this issue was prepared by Roger S. Huntington, of Huntington & Guerry, and tells of the Textile Products Show—another one of Greenville's achievements—that is being held in Textile Hall in October.

The National Association of Cotton Manufacturers opened a branch office on October 1 in the rooms of the Association of Cotton Textile Merchants at 70 Worth Street, New York City. The Association is doing this with a view to making the facilities and services of the organization more accessible to the many members who are located in the dry goods district of New York City. The secretary of the Association, Harry C. Meserve, will be at the New York offices periodically and will make and keep appointments there. Rooms will be available for committee meetings.

Bleaching Fabrics Containing Colored Effect Threads.

A patent taken out by the firm of Lumsden & Mackenzie and Morris Fort, M.Sc. specifies an improved process of scouring and bleaching cotton or linen yarns or fabrics containing dyed effect fibers or threads, whereby the well-known difficulty of avoiding bleeding and staining during boiling or scouring with alkaline solutions is largely or entirely overcome. The dyed colors are also better preserved, the fabrics yield a superior finish and appearance, and in many cases a much better white can be obtained than by any known scouring and bleaching operations hitherto applied to this class of material.

In comparatively few cases among the dyed colors used to withstand bleaching, with the exception of a few insoluble azo dyes and indigoid vat dyes, will solvent extraction, with organic solvents such as benzol, naphtha, and benzine, hot or cold, seriously affect the color of dyed fibers or threads to cause staining or excessive bleeding. Other solvents than these also may be used, for example, alcohol and chlorinated hydro-carbons, but these latter are more likely to affect the dyed shades than the hydrocarbon solvents. The process, therefore, commences with the extraction of the goods in bulk with a volatile or organic solvent whereby are eliminated from the fabrics substantial amounts of impurities, chiefly oil, fat and wax and allied and associated matter for the removal of which alkaline scouring or boiling has hitherto applied.

The extractions with solvents may be carried out by the use of any known method or apparatus, and the solvent employed recovered as well as the extracted oily, fatty and waxy matter by steaming, distillation and other known means of recovery.

After this, a much shorter or milder scouring with alkaline solutions than is usually required, or is otherwise permissible, to attain in conjunction with subsequent bleaching satisfactory purity and whiteness, can be given to the goods, as for example, boiling without pressure where otherwise pressure is required, or saturation with hot weak alkaline solutions by running through a machine or by passing hot alkaline solutions through the goods instead of boiling with alkali, or sodium carbonate may replace the use of caustic soda or lime, or caustic soda the use of lime.

Very rarely will dyed effects in cotton and linen goods intended to undergo scouring and bleaching, withstand without alteration the most effective alkaline scouring treatments such as can be safely given to ordinary goods when dyed effects are not present, for example, boiling in a kier for upwards of eight hours under pressure with lime or caustic soda. With less severe scouring treatment the dyed colors in use vary widely in the degree of severity which they can withstand and the scouring agent, temperature, concentration and time of treatment require to be varied to obtain the best results in each case, of which the fastness of the different dyes present will allow.

After submitting the goods to solvent extraction the alkaline scouring treatment which follows is varied, therefore, for different dyed effects. In all cases a sufficiently safe alkaline treatment is used in which there is no liability for bleeding and staining to occur, yielding results as regards purity and whiteness after bleaching which could not otherwise be obtained without solvent extraction. In fact results are obtained such as otherwise would require for their attainment more severe alkaline scouring treatment productive of simultaneous bleeding and staining of the dyed effects.

As an example of this, cotton piece goods containing woven stripes dyed with Indanthrene Blue G C D are required to be scoured and bleached to a good white with accompanying high degree of purity, including freedom from fatty and waxy matter. When boiled under pressure for eight hours with milk of lime or saturated lime water, or two per cent caustic soda solution, a high degree of scouring efficiency is attained, but bleeding and staining of the whites occurs and subsequent bleaching treatment does not clear the goods of the stains.

A superior white and high purity with complete freedom from greasy and waxy matter, and without any bleeding or staining, are obtained by first of all extracting the goods with hot benzol in any usual manner. The oil, fat and wax present dissolve readily in hot or boiling solvent, and when the dirty solvent has been removed and only clean solvent is left in the goods this also is finally removed by steaming, condensation and the recovery of the solvent and the dissolved waxy matter.

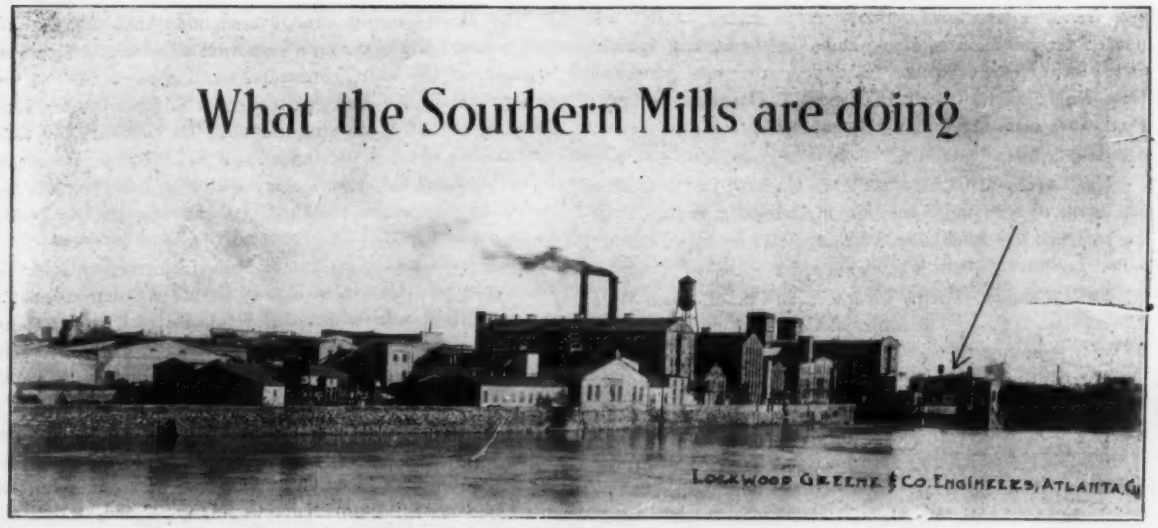
The process occupies only a few minutes where a small bulk of material is treated, but may extend to twelve hours or more in the case of large lots of two tons or more owing to the longer time required in heating, circulating or changing the solvent, steaming and recovery.

The goods are then treated either in the same vessel or in an open kier, with two to four per cent sodium carbonate solution, hot or boiling, during six to eight hours, without pressure. The subsequent bleaching treatment consists for example of scouring with one per cent sulphuric acid solution, chemicking with ½—¾ deg. Tw. bleaching powder solution and again scouring as before, washing between the operations and at the end.

A good white is generally obtained, but in the case of goods exceptionally difficult to bleach the bleaching treatment already given may be repeated, with or without scouring again with sodium carbonate. Without solvent extraction the same mild scouring and bleaching treatment fails to yield the standard of purity and white required, while the presence of difficult oil stains or unsaponifiable fatty or waxy matter, for example in sizings, enormously increases the difficulty of dealing with goods when dyed effects are present if ordinary scouring methods are applied. The presence of these impurities offers little or no extra difficulty when proceeding according to this process, as they are removed from the goods by the solvent treatment—*The Dyer and Calico Printer.*

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., have issued Bulletin No. 1118, which is descriptive of their new line of continuous rated polyphase induction motors. This bulletin covers the type "AR" squirrel cage line, which is now on the market, also the new type "R" potential starter.

National Brilliant Green B Crystals, now manufactured by the National Aniline & Chemical Co., Inc., produces somewhat yellower and brighter shades than National Victoria Green W B Crystals and is recommended for the production of brilliant greens on cotton or silk. This new product will also find considerable use for the topping of dyeings made with direct dyes.



Eagle & Phenix Mills and Power House, Columbus, Ga.

With the resumption of operations on Monday, September 12, at the Calvine plant of the Chadwick-Hoskins Company, at Charlotte, N. C., the strike of textile workers which was called in eight mills in Charlotte and at Concord and Kannapolis on June 1, was virtually ended. All the other mills affected by the strike had previously resumed operations, and while a few of these mills do not, at this writing, have complete working organizations, the striking employees who have returned have taken their jobs under the same conditions existing when the strike was called, and at the same wages, so far as can be learned, thus defeating their own purpose in the strike, which was called in objection to reductions made in wages totaling more than 22½ per cent of the peak war rates.

There was some effort on the part of strikers at some of the plants to induce the mill officials to receive the workers back into the mills as a body representative of the union organization and without discrimination. However, announcement was made by the mill managers that under no condition should they agree to this plan, that every individual person would have to come back to the mills as an individual, and not as a part of a body from the union.

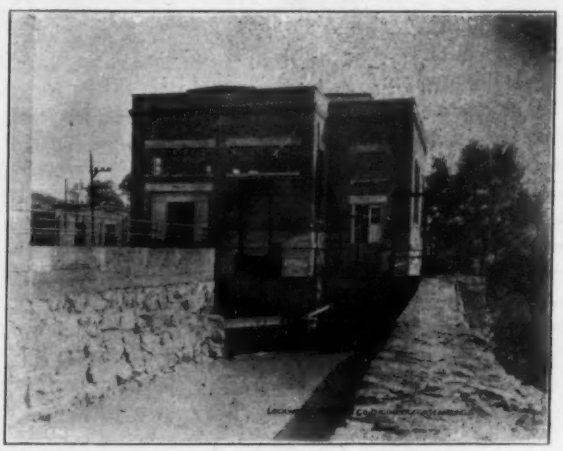
At this time, reports from New York, where the United Textile Workers have been in convention, is to the effect that this union is to promulgate a campaign for an eight-hour day in the textile industry where it does not already prevail. A meeting of the U. T. W. is called to convene in Charlotte on September 22.

The Quitman Cotton Mills, Quitman, Ga., were recently sold to the Western Reserve Cotton Mill Company, of Kent Ohio, a branch of the Mason Tire & Rubber Company, and will be operated under the name of the Western Reserve Cotton Mills Georgia Company. The plant will manufacture cord tire fabrics, and it is reported to be the plan of the new owners to acquire other mills in the South for the manufacture of this product. The new owners will thoroughly overhaul the property, it is stated. A. C. Grundmann is assistant secretary and B. S. Piper is superintendent. This property was formerly owned by W. H. Newton, H. E. Newton and Mr. Harding, of Forsyth, Ga.

The Couch Cotton Mills, Inc., of East Point, Ga., which have been in the hands of a receiver, were declared solvent on September 5 by U. S. District Judge Samuel H. Sibley, on testimony of W. D. Couch, president of the company, that a competent appraiser had valued the property at between $1,400,000 and $1,500,000, while its debts were less than $850,000.

The Blue Buckle Cotton Mills, Rock Hill, S. C., have recently completed the installation of 19 additional cards. The new cards will allow the mill to place 330 additional looms in operation.

The Icemorlee Cotton Mills, Monroe, N. C., have under consideration the construction of a weave shed and the installation of about 100 looms therein.



A Close-Up of the Power House.

The Jenkins Mills, of Greenville, S. C., have been incorporated with a capital stock of $25,000 to take over the property of the Prospect Mill, at Batesville, S. C. The officers of the company are: J. A. Jenkins, president and treasurer; W. H. Gray, vice-president; and C. H. Scruggs, secretary. These officers are all connected with the W. H. Gray Mfg. Co., of Woodruff, S. C. The Prospect Mill is listed as having 3,000 spindles making 8s to 12s yarn on tubes and cones. Extensive improvements in machinery

and facilities are contemplated, it is stated, which will include the installation of a number of additional spindles and possibly some looms. The property was purchased from McMillan C. King and Ernest J. Decamps, the president and secretary-treasurer, respectively, of the former company.

The Vardry Mills, Greenville, S. C., have just completed the installation of individual motor drive on spinning, twisting and picking machinery, and have also installed sanitary toilet facilities.

The Columbia (Tenn.) Cotton Mills Co., of which W. F. Embry is manager, will improve the plant and install additional spinning frames and 50 looms.

The addition to the building occupied by the store of the Ware Shoals Manufacturing Company, Ware Shoals, S. C., has been completed. The structure is three stories high, and is 100 feet wide by 202 feet long. A modern drug store has been installed in the corner of the building, and hardware, men's clothing and furnishings, shoes, ladies' furnishings, furniture, etc., are provided with facilities for distribution in the completed building.

Operation of a sack factory with a daily capacity of more than 50,000 cement sacks will begin within the near future at the Ware Shoals Manufacturing Company, Ware Shoals, S. C. The machinery for the sack factory has been moved from Wilmington, N. C., and is being installed in the basement of an existing mill building. Initial operations will require the services of more than 60 operatives, it is stated. The plant will be a branch of the Riegel Sack Company of New Jersey, it is understood, and will use cloth made at the mill in Ware Shoals. For the present, only cement sacks will be manufactured, although additional lines may be taken on later. The electrical sewing machines, cutting machines, printing presses, etc., are now being installed and operations will begin as soon as this work is completed.

The North Carolina Corporation Commission has overruled the exceptions of thirty-five cotton mills and the Southern Power Company to the order of the commission increasing the rates charged by the power company for its service to cotton mills approximately 20 per cent. In concluding its decision on the matter, the commission said, "The Corporation Commission, having carefully considered the exceptions both of respondents and petitioner, and deeming them without merit, hereby overrules them, thereby leaving the original order in full force and effect."

The Woodson Mills, Salisbury, N. C., have been incorporated by C. W. Woodson, E. H. Woodson and W. B. Woodson. The capital stock of the company, which plans to manufacture cotton goods, is $100,000.

The Cabarrus County Superior Court at Concord, N. C., has signed an order making permanent a temporary injunction granted in Charlotte holding the county commissioners to the valuation placed on the Cannon Mills property by the state tax commission, and perpetually enjoining the tax collector and county authorities from changing the assessment made by the commission in February of this year.

This decision has nothing to do with the hearing which was recently held in Raleigh before Commissioner Watts relative to the assessment of the Cannon Mills. This decision relates only to the 1920 taxes, while the hearing in Raleigh was in regard to the 1921 taxes.

The county commissioners contended that the Cannon Mills should pay taxes on a valuation of $13,900,000, which members of the board contended was the assessment of the mill property in Cabarrus County agreed upon by the commissioners and the state commission. In February the state commission reduced the taxes from $13,900,000 to approximately $9,000,000, and the injunction granted forbids the collection of taxes on the $5,000,000 decrease allowed by the state commission.

The appeal of the Cannon Mills from the appraisal of the county commissioners, caused six other Cabarrus county cotton mills to ask the State Revenue Board that the valuations on their property be reduced in a proportion corresponding to the reduction made on the Cannon Mills valuation.

R. D. Powell and associates are reported to be planning the erection of a blanket mill at Lebanon, Tenn., the proposed building to be 60 by 110 feet, with concrete floor.

The Union-Buffalo Mills Company, Union, S. C., are planning for additional playground space and equipment for the use of the families of their employees.

The New England Mill Situation.

The great rise in cotton has changed the aspect of mills affairs very materially in this section. So long as the rise was of a gradual character and was reflected in firmer prices for goods, it was possible to maintain a reasonable chance for profit. But with prices up 25 per cent in a few weeks, it has been impossible to sell goods on the basis of replacement costs. It may be many weeks before the consuming trade of the country responds to higher cloth prices that are now inevitable.

The deterioration of the crop growing on the limited acreage planted has apparently affected long staple cotton more seriously than the low end and prices, when quoted at all, have shown extraordinary advances. Mills have not been able to secure cotton at many of the nominal prices for the reason that it is not yet clear whether cotton may be had to cover the sales. The mills have been selling their stock goods slowly at slightly advanced prices, and several of them have been willing to accept contracts for cloths to the extent of cotton in hand. On orders suggested for late delivery, for which actual cotton is not in sight, mills have been declining to quote.

When the sharpest advances began in the early part of the month, selling agents were taken by surprise and began to withdraw all offerings. Mills became insistent on this. Agents did not seem to consider the cotton outlook as seriously as manufacturers did for several days. The manufacturers were confronted with an inabilty to buy at any of the speculative prices quoted. They could buy futures, but the premium asked for actual cotton ran as high as 450 points on various future months. This contrasted with 250 points off, which was possible at one time as late as July. The actual cotton buyer for the mills saw speculative prices going up, but he also saw a change of between 6 and 7 cents a pound in the differentials.

When speculative markets began to react a little and it began to be seen that buyers of cloths were not rushing in to make engagements at higher prices as they did in war times, the selling agents for mills were confronted with the necessity for adopting some merchandising policy that

would at least protect their mills. Some agents began selling small lots of stock goods at slowly rising prices. Others marked prices up to the parity of cotton around 20 cents. This latter advance seemed very radical yet it left the mills in no better relative position than they were when cotton was at 12 cents.

As matters now stand, new price lists are being announced from day to day, and buying has become of a very conservative character on anything offered at full prices upon costs. Fortunately for the future possibilities of the markets, many of the mills are contracted ahead. The gingham mills have business in hand for the balance of the year. Many of the gray goods mills have orders that will take care of at least half of their output through November. The large printers sold ahead to the extent of their gray cloth stocks and have orders that will keep them busy for at least two months.

There are many manufacturers who believe that the retail and jobbing stock conditions are in such clean shape that when the actual fall retail counter business assumes a normal aspect, sales of goods will be made steadily at the higher prices. Others are very skeptical and are of the belief that the decreased purchasing power of the mass of people will make it very difficult to secure higher prices this winter. The retail trade has been slow in getting underway. There has been a very decided quickening of business from the South where the high cotton prices have improved sentiment and restored confidence in some degree. But even in the South it has been found that buyers will not bid cloth prices up to a parity with cotton and will not buy freely on very moderate advances from the low points.

The southern buyer of cotton goods is moved in his merchandising policy by the same influences that affects buyers elsewhere. He will gladly pay higher prices when he knows that he can sell at higher prices. At present, he only knows that he will be able to sell more goods than he provided for, but this knowledge does not yet go so far as to make him think that his customers will buy freely at higher prices. Hence he does not bid more and prefers to confine his orders to goods he believes can be paid for this year.

The actual advances secured on any material volume of sales from first and second hands do not exceed 20 per cent in cloths. This compares with a rise in cotton, approximating 100 per cent from the low point, at one time. Manufacturers are confident that this disparity of value will disappear gradually and despite their disappointment concerning the quality of the crop now assured, they are optimistic about the working out of prices if advances are nursed rather than forced.

While some of the larger plants in this section are running in full with some departments running over time, there are others that are still on short time, or running regular hours with only part of the equipment employed. The large Pepperell Mills of Biddeford are running some departments only three days a week and this condition is found in some of the better known mills making colored cottons. The curtailment of operations is less than it was. In Fall River, there are still some mills closed. There are several mills there that are running about 80 per cent capacity. In New Bedford, while many of the mills are now running full time, they are not operating more than 85 per cent of the machinery. This does not mean that the mills are losing money, a fact proven by the recent quarterly dividends at New Bedford, where an average of more than 2.3 per cent was paid on the capital stock. In Rhode Island some of the Knight mills are wholly closed and others have only recently resumed operations in full.

About the middle of the month it was announced by a Rhode Island newspaper that a 20 per cent wage reduction was under contemplation among New England manufacturers. In the announcement, the newspaper gave circulation to wage comparisons between northern and southern mills, and to the age old story of southern competition. Based upon figures of wages paid to weavers or other workers, or upon the hours of labor per week compared with the 48 hours prevailing in Massachusetts, it was again demonstrated that southern mills are favored.

It is nevertheless true, that some very important manufacturers in New England are opposed to any united action to reduce wages again in the textile mills of New England, either 20 per cent or any other stated percentage. They believe that market and general industrial conditions throughout the country are in that stage where any reduction in wages mills may make will be quickly lost in the cost of distribution and favor the merchant without giving the customer much more for his money than he now receives in cotton products.

Another phase of the wage problem in New England today is that winter is approaching and because of high prices, it takes almost a week's labor for a weaver to get money to pay for a single ton of coal. In the garment making and clothing industries, labor not as well skilled, receive twice as much. In other words, several manufacturers contend that the textile worker in cotton manufacturing centers has been ruthlessly cut, while other workers are still earning much higher relative wages. The manufacturers who are expressing this view of wage conditions are not thinking of the operative alone, but are trying to point out that further reductions in mill centers this winter will merely cheapen cotton mill labor again, without giving either the cotton grower or the actual manufacturer his just share of what he produces. They even argue that it would be better for the industry to enter upon another period of curtailed production than to set a low wage standard at this time.

It is true of New England as it is of other sections, that wages are being constantly reduced in all industries. What is of largest consequence is that the efficiency in the mills is being increased. While actual wage schedules in some plants show only a cut of 22½ per cent since a year ago, the actual reduction of labor cost per pound of product has reached as high as 50 per cent compared with a year ago. This has been brought about by harder work and more attention given to work on the part of the operatives. It is now possible to select the best workers and allow the others to go elsewhere. In other words, individual management and competition for jobs are doing all that ought to be done to reduce labor costs. Of course if it seemed possible for the manufacturer to add the reduced labor cost from lower wage schedules to his own earnings rather than to the profits of the sellers of goods, a different view would prevail. The indolence and indifference of mill workers so exasperating a year ago has not wholly disappeared but it is no longer the fact that extravagantly higher labor costs rule in the mills that are at all well managed.

The August reports of conditions of employment in

finishing plants showed as follows: White goods, 74 per cent employed; dyed goods, 76; blacks, 58; and printed, 65. These reports do not include returns from the large corporation printers. There was a gain in August of 7 per cent on white goods, and black goods; a gain of 8 per cent in printed goods, and a falling off of one per cent in dyed goods.

Eastern cotton yarn spinners did not follow the rise in yarn prices made by southern mills in the late summer but during September they revised upward very drastically after having sold their stocks quite freely and entered moderate sized contracts for the balance of the year. There has been some improvement in the demand for tire yarns and tire fabrics and a distinct improvement in the inquiry for braids, tapes, etc.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, Sept. 20th, 1921.

While raw cotton has nearly doubled in value during the past two months, indications are that higher, perhaps much higher, prices will be witnessed eventually.

Because of returns to the government, as of August 25th, pointing to a yield of only 7,037,000 bales, we had occasion at that time to arrive at deductions pointing to a probable carry-over by the world at the close of July, 1922, of American cotton approximating only about 4,000,000 bales vs. 9,194,000 carried over at opening of this season.

According to reports from the interior there has been a further marked deterioration in the condition of the growing crop, due to drouth in the south Atlantic section, a cloudburst in south Texas, and damage by weevil, rust and shedding. In consequence the trade is anticipating a further reduction in the probable size of the crop in the last of the monthly crop forecasts to be made by the government on October 3rd, probably less than seven million bales, perhaps low as 6,500,000.

Already the trade is facing the probability of a famine in cotton this season, that is later in the year, especially of desirable spinning qualities, and if the indicated yield is to be reduced to a smaller estimate than that of one month ago, the situation will likely be made all the more acute.

Realizing the seriousness of the situation that will probably develop ultimately, spinners are taking time by the forelock by buying for their future requirements, especially in Liverpool where sales have been unusually large for some time past, also in Texas, upon which England and Japan depend so much for their requirements, having become alarmed owing to prospects for so small a crop in that state—1,938,000 bales vs. 4,345,000 last year.

That the trade is apprehensive of higher prices eventually, and of the probability of a famine ultimately, particularly in good grades, is reflected in the large shipments during August, the first month of the season, to Europe and Asia, compared with the corresponding month last year.

Exports from the U. S. during August, compared with last year, were as follows: To Great Britain 69,000 vs. 44,000; to France 53,000 vs. 9,000; to Italy 21,000 vs. 9,000; to Germany 132,000 vs. 46,000; to Japan 130,000 vs. 1,000; to all other countries 90,000 vs. 38,000; total 495,000 vs. 147,000.

Meanwhile shipments to foreign countries since the close of August have continued to run well ahead of exports for the same period of one year ago, now amounting to 671,000 against 254,000 last year, with prospects for comparatively heavier shipments during October, as large bookings are reported from Galveston for that month, principally for France and Japan.

In the meantime American mills are poorly supplied with the raw material for their needs, as they are using nearly 500,000 bales per month, especially as domestic consumption is increasing, figuring 467,000 bales for August vs. 410,000 for July of this year. On August 31st American mills held a stock of only 1,003,000 bales against 1,127,000 last year when trade was poor and consumption during the last quarter very small.

The South is taking advantage of the situation by selling slowly, offering freely on advancing markets only, refusing to sell on important depressions. In other words, farmers are holding, some for 20 cents, others for 25 cents, while not a few expect to obtain 30 cents eventually.

In keeping with developments in the cotton market, the textile markets have become active, a larger business doing, with values advancing, most mills having resumed operations, many on full time, some working night and day on business booked for months to come.

The fundamental features of the situation are very bullish.

A Motor Driven Fan.

A ventilating fan combining the advantages of light weight, durable construction and efficient operation, and which can be operated at a variable speed with a constant speed motor, is being manufactured by the Bayley Manufacturing Company, of Milwaukee, Wis. It is claimed to work equally well in either vertical or horizontal position, is of simple construction and is easily installed.

A unique feature of this fan is that it is equipped with a speed controlling device that permits a variation of from 2½ per cent to 100 per cent of full speed without any variation in the speed of the motor. This is accomplished by varying the belt tension by turning a hand wheel of the adjusting mechanism until the desired speed is obtained. The motor is located beneath the fan, and is hinged at one end so that by adjusting the hand wheel the pulley end is moved toward or away from the fan pulley.

Aside from the convenience of absolute control of the speed, when it is necessary to vary this in accordance with the load, it is said this arrangement assures economy in current consumption, as the current consumed by a motor varys almost directly with the amount of work the motor does. Having the motor running at a constant speed at all times, eliminates dissipation of resistance coils in the motor that might be caused by variations in speed.

This fan is furnished in seven sizes, varying from a 16-inch diameter to a 48-inch diameter.

It is when we're green that we grow; when we think we're ripe, then we begin to rot.

Slashing Cotton Warps

BY WILLIAM B. NANSON.

The Size Box (Continued.)

When the slasher is in operation, the size box is partly filled with size and the immersion roll C2, Fig. 1, placed in such a position that the yarn in passing partly around it passes through the size, becomes coated with it, and to a certain extent absorbs the mixture in excess of the requirements. The excess of size is pressed out as the yarn passes between the two sets of rolls d and e and d1 and e1 and flows back into the box.

The size in the size box is usually kept in a boiling condition and to do this live steam is usually injected into the size box, there are various ways of doing this, a perforated pipe extending across the whole width of the box being the method usually advised because it is essential that the size be kept uniformly hot or the result will be uneven slashing and consequent bad work in the weave room.

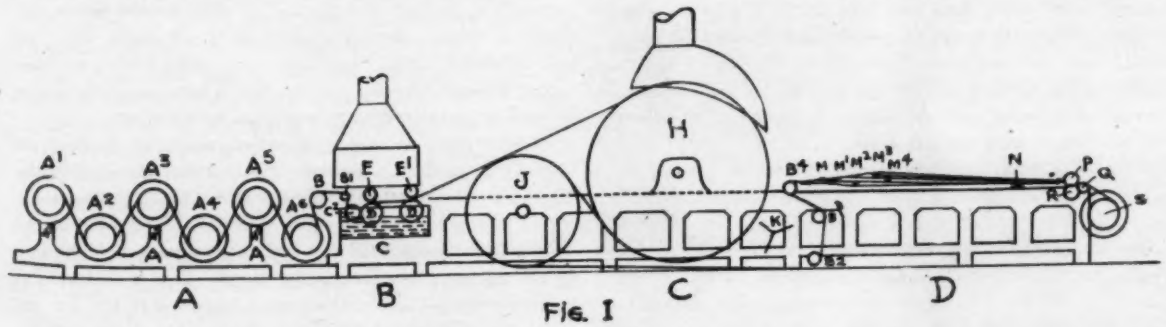


FIG. 1

Under any method of piping the steam into the size box, if any form of gravity system is used to convey the prepared size into the size box the dressing will be irregular and I strongly advise against the use of practically every form of gravity system for supplying size to the size box of slashers. Size should be maintained at as near a uniform temperature as possible and should be constantly agitated. In any gravity system the temperature of the size varies, and size which has not been kept in agitation is admitted into the box, causing harsh and rough places in the warps, irregularly sized warps and poor weaving conditions.

Size should always be furnished to slashers through a circulating system by means of a rotary or centrifugal pump, this in connection with a heater will circulate and agitate the size between the boiling kettle and the size box and keep it uniformly hot and consistent continuously. If a heater is used, no steam pipes are needed in the size box, which makes for cleanliness and efficiency. When shutting down the slashers, the contents of the size box, the tempering kettle or the receiving or stock tank, where one is used, are returned to the upper or cooking kettles to be re-used and the entire system is blown out with live steam or washed out with boiling water if necessary.

The size rolls d, d1 are positively driven by a train of gears and a side shaft from the drag rolls at the slasher head as shown in Fig. 2, and it will be obvious that the surface speed of the size rolls and of the drag rolls must be the same. Loss of elasticity is the chief cause of warp yarns breaking at the loom and this because there is too much stretch between the size rolls and the drag rolls. If the warp yarns are unduly stretched when wet they lose their elasticity and when this condition obtains when they are put into the loom and are pulled out of line by the harnesses lifting and lowering, a certain amount of strain comes on almost all the warp ends (especially at the selvages) at each lift of the harnesses, and if the warp ends have no elasticity or the vibrator is set to follow the movement of the harnesses, the ends are continually breaking. For this reason, the side shaft was adopted to drive the different parts so that

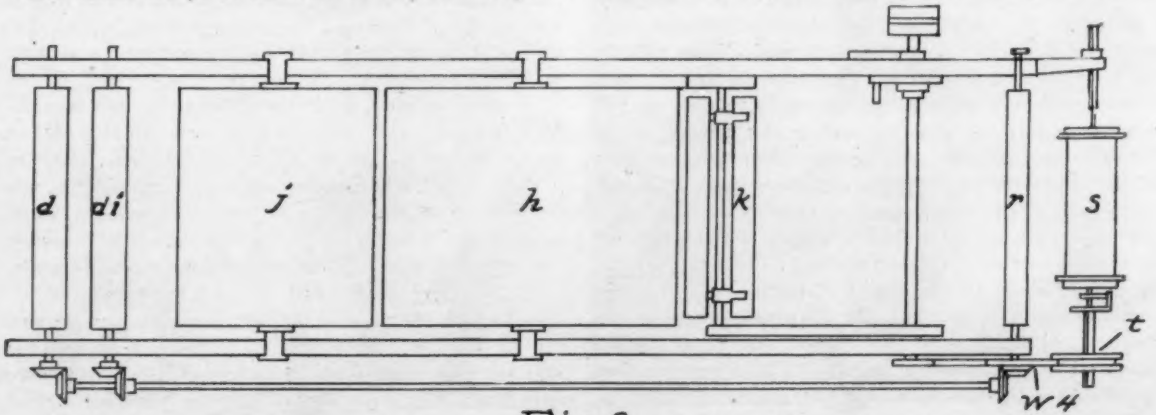


Fig. 2

the size rolls will deliver the same amount of yarn as that taken up by the drag rolls.

I might say here, before going further, that the yarn may also have the elasticity taken out of it if the section beams have too much friction on them and are held too tight. This is quite likely to happen when the yarns get low on the barrel of the beam. Slasher tenders should watch at all times the percentage of stretch between the size rolls and drag rolls. It is perhaps necessary that there should be a slight amount of stretch on the yarn. When there is too little stretch and the yarn runs slack the yarn does not hug the cylinder close enough and is imperfectly dried but is dried on the loom beam instead, in which case the ends become matted and stick together to such an extent that they break when they come up against the lease rod on the loom. It is not a good thing to have the yarn turn the cylinder as is almost always done. In this case, especially if the warp is light or contains few ends, the elasticity of the yarn is lost. The squeeze rolls E, E1, Fig. 1, are driven by frictional contact with the size rolls. As the squeeze rolls are made especially heavy and covered with cloth, these two sets of rolls grip the sheet of yarn sufficiently firmly to pull it from the section beams and through the size box. The rolls D, D1 revolve in fixed bearings, but the bearings of the rolls E, E1 are carried in vertical slots, which allows them to be raised, if necessary, out of contact with the size rolls.

The ends of the immersion roll C2 rest on a rack that carries on its other end a gear. A worm that engages with this gear is on a stud with a handle, the turning of which raises or lowers the immersion roll as may be desired. It is frequently necessary to change the position of this immersion roll since, unless specially arranged, the size is not always the same depth in the box and yet the size should always cover the same amount of surface of the immersion roll, at any rate while sizing the same set of beams, in order to insure the yarn being uniformly sized.

The squeeze rolls are common iron rolls about six inches in diameter; these are first covered with three or four layers of ordinary cotton sheeting, which is either glued on or thickly covered with white paint, the paint preventing the size from striking through to the iron roll and at the same time glueing the cotton sheeting fast to the iron roll; this in turn is covered with woolen slasher cloth so as to make a soft elastic cushion to press the size into the yarn. For the rear roll from 3½ to 4 yards of 16 ounce cloth and for the front roll from 4 to 5 yards of 12 ounce cloth will be found usually to answer very well. When winding the cloth on the rolls, care must be taken to have the laps follow on the outside, so they will not be roughed up. It is not necessary to fasten the cloth in any manner, as the size will soon stick the laps together, but should any part of the outer edge become folded over, thus causing a bunch on the roll, it may be laid smooth by passing the end from a bobbin of yarn around the roll a number of times after all bunches and wrinkles have been straightened out.

Slasher cloth, through being in contact with the size, soon becomes stiff and unpliable; to remedy this it should frequently be taken off and steeped over night in luke warm water (not over 100 degrees F.) to which has been added 8 ounces of diastofor to each 10 gallons of water. In the morning bring this liquor to a boil to kill the diastofor and dissolve out the starch, now converted into sugar; rinse the cloth out in clean water and wind on the rolls again. By this process the starch is all removed and the slasher cloth is as good as new.

The Size Kettle.

A kettle for cooking the size should be of iron and cast solid. The cover is bolted in place, provided with steam pipe connection and a semi-elliptical opening, having a door with a handle, used for the admission of the sizing ingredients and fitted with 2-inch opening at the bottom for drawing off the size, a 2-inch pipe with just an elbow at the bottom should also be used for boiling and this should be trapped before entering the kettle. This arrangement is better for boiling than perforated or any other pipes encumbering the bottom of the kettle as the one 2-inch pipe blowing steam through an elbow set at a right angle keeps the liquor in constant motion in all parts and uniformly boils every portion of it. This is for size to be used by the gravity system.

A stand with two bearings is securely mounted on the top of the kettle for carrying the short driving shaft with driving pulleys 14 inches by 2 inches, usually running at 100 revolutions per minute. Bevel gears operate the vertical shaft extending into the kettle. The stirrer blades are mounted on the vertical shaft. Some are made with two sets of stirrer blades revolving in opposite directions; this makes a very effective mix-up but is not necessary where the size is boiled with a 2-inch pipe as described.

Where, however, the circulation system of feeding the size box is used it is better to use a steam jacketed kettle. This is a plain kettle arranged with an inner copper shell. Steam is admitted to the space between the exterior of the shell and the interior of the kettle, permitting maintenance of the size at a uniform temperature. This is desirable as the continual boiling with steam admitted into the size reduces, through condensation, the consistency of the mixture. Many mills operate a size circulating system wherein a constant flow of size to the box is maintained, an overflow being provided to keep the size at a uniform level in the size box.

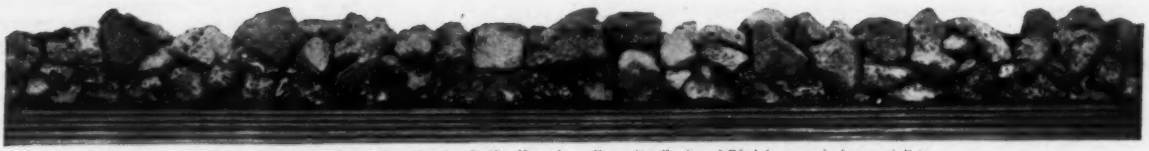
The capacity of the size kettle may vary from one of 33 inches diameter 32 inches deep containing approximately 100 gallons to one 48 inches by 48 inches containing 360 gallons.

Cylinder and Center Frames.

The standard cylinder slasher is equipped with two cylinders, Fig. 1 and Fig. 2, one being 7 feet and the other 5 feet in diameter. Both cylinders are 60 inches wide over all with an actual face of 57½ inches between hoops. This style of cylinder gives ample heating surface for all ordinary requirements.

A third cylinder, 40 inches in diameter, can be added advantageously when slashing dyed yarns where colors are apt to run and by this means the colored yarns are dried, or partially dried, before they are brought into contact with the white yarns constituting the rest of the pattern, on the main slasher cylinders. This combination is used in connection with a double size box arrangement by mills running ticking or other goods containing striped warps.

Cylinders are made of the best obtainable copper; number 15 stock .072 inch thick being used on the seven-foot cylinder, and number 16, .065 inch thick, on the five-foot cylinders. All joints should be dove-tailed and brazed. Heads are made of ¼-inch steel plate and thoroughly stayed by rods. Scoops or buckets are provided inside each cylinder for removing the condensed steam and I might



Cross-section of a Barrett Specification Roof. Note the uniform distribution of Pitch between the layers of Felt.

Right Construction is *Half* the Roof—

STUDY the illustrations at the right. In these the successive steps in the building-up of a Barrett Specification Roof over concrete are graphically shown. The Barrett Specification describes in detail the manner in which the roof shall be laid, because *right construction is just as important as the use of right materials.*

The Barrett Specification Roof for flat- or nearly flat-roofed buildings, consists of several alternate layers of Specification Pitch and Specification Felt, with a surface covering of gravel or slag. These materials are used because 60 years' experience has proved—

— that no other bitumen has the weather-resisting properties of this high grade pitch;
— that no other kind of felt has the lasting tensile strength of this carefully selected felt;
— that no other surfacing material renders a roof so highly fire-resistant as gravel or slag which serves the further purpose of holding in place the extra-thick *poured* top coat of Barrett Specification Pitch.

The concrete roof-deck is heavily mopped with a uniform coating of Barrett Specification Pitch.

Left: Mopping on the Barrett Specification Pitch. Each layer of felt is hermetically sealed to the adjoining layer by the pitch waterproofing. In no spot do the layers touch each other.

Right: Laying the Barrett Specification Tarred Felt on the pitch seal coat. Four plies with pitch in between are laid over the entire roof surface, each ply overlapping three-fourths of the preceding ply.

Have your roofing contract call for the 20- or 10-year Surety Bond Guaranty. This is issued free of charge through the U. S. Fidelity and Guaranty Company of Baltimore. Then you will be sure that Barrett Specification materials will be applied, in sufficient quantities and by proper methods. For all Barrett Specification Bonded Roofs are constructed under the watchful eye of an experienced Barrett inspector who is present on the job to see that the Specification is strictly complied with.

Before specifying or closing contract for a Barrett Specification Roof, be sure to read carefully all the stipulations in the Specification.

Below: Pouring final coat of hot Barrett Specification Pitch and embedding thick wearing surface of gravel or slag after entire roof has received four plies of felt and pitch

Full details regarding these Bonded Roofs and copies of The Barrett Specifications sent free on request.

The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis	Cleveland	Cincinnati
Pittsburgh	Detroit	New Orleans	Birmingham	Kansas City	Minneapolis	Dallas
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Barrett Specification Roofs

Bonded for 20 and 10 Years

say here that this condensation removal is of the first importance, for, if any undue body of water is allowed to form in the cylinders it throws them out of balance, or equilibrium, and makes them hard to turn, with the consequent straining of the yarn and its resultant loss of elasticity making it tender and brittle and thus hindering the production of the weave room. At this point I again warn the slasher man to be ever alert to prevent the possibility of strained yarn at all points on the slasher where it may be made.

All cylinders should be carefully balanced, and tested to bear a pressure of 15 pounds or more before being put into use.

Vacuum valves should always be provided in each cylinder to prevent the collapse of the cylinder when being cooled off.

Truck bearings are usually furnished with cylinders but roller bearings are much better and should be used instead. They are much more durable than the truck bearing and make an easier running cylinder. The tension on the yarn is greatly reduced, and the production increased. Again I would remind the mill manager that *all* the productive work in the mill goes through the slasher and that any improvement or—per contra—defect made on the slasher affects the whole mill up to the stockholders' pockets.

For ordinary work the cylinders are revolved by the pull of the warp by the drag roll but for fine work or light warps a positive gear drive may be used. This consists of a set of toothed segments fastened to the outer circumference of the cylinder head and driven by a suitable spur and bevel gears from the side shaft of the machine. When cylinders are revolved by the pulling of the warp, a considerable strain is put upon the yarn, resulting in excessive breaking of ends. With the gear drive this strain is eliminated. It is not advisable to apply this drive on heavy warps, as quicker drying is obtained by the closer contact of the yarn to the cylinders when under the strain of pulling the cylinders around.

Each center frame should be fitted with a system of extra carrying rolls for very heavy warps by means of which about 95 per cent of the drying surface of the cylinders is utilized. These must not, however, be used on light warps. Fig. 3 is a diagram showing the position of the extra carrying rolls. Each slasher must be fitted with steam gauges (20 pounds) steam traps, steam pressure regulator, and safety valve.

A steam pressure regulator, 1½ x 1½ for a two-cylinder machine, is necessary when live steam is used to heat the cylinders. In operating directly from boiler pressure it is good practice to reduce the pressure in the line supplying the slasher to not over 40 pounds. Then small weights are furnished with the regulator, each weight representing about one pound pressure in the cylinder. There is also a larger weight resting on the lever while the slasher is running and which is raised when the slasher is stopped by means of a finger on the shipping rod. When this weight is raised the pressure on the slasher cylinder is somewhat reduced by shutting off the steam from both cylinders. When the driving belt of the slasher is shipped on to the tight pulley to start the slasher up again, the starting rod is moved to the left, which, acting through the lever raising the rod, lifts the finger lever, thus admitting steam to the cylinders. When the machine is stopped, by the belt being moved to the loose pulley the starting rod moves to the right, allowing the weight to force down the lever and close the valve, shutting off the steam.

It is not advisable to admit steam at too high pressure to the cylinders, owing to their immense surface and light construction, and also on account of the fact that a high pressure of steam means a high temperature, which would tend to burn the yarn on the surface of the cylinders. Reducing valves are therefore provided in cases where live steam is used, so that the pressure of the steam will be reduced to less than 15 pounds. The pressure used depends

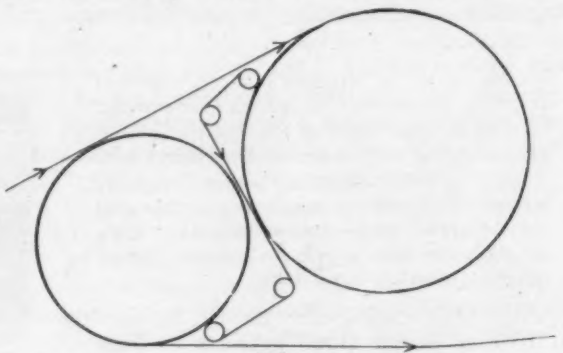

Fig. 3

on the work being slashed. In some machines, exhaust steam is used, which is of course at a low pressure and does not require the use of a reducing valve.

The steam that rises from the boiling size in the size box and also the moist air produced by the drying of the yarn on the cylinders is quite appreciable in quantity, and some arrangement is necessary to remove this from the slasher room. To accomplish this, the steam is taken away either by natural or mechanical draft. In the former case, the slasher is usually covered with a wooden or metal hood, and a flue connected to the upper part of this hood is carried out of the mill. In case mechanical draft is used, hoods are generally placed over the large cylinder and over the size box, and fans driven by power used to carry off the moist air.

Headstock.

The headstock of a slasher comprises practically all the parts situated in front of the cylinder.

The first point on the headstock reached by the warp yarns are the split rods m, m1, m2, m3, m4, shown in Figs.

Fig. 4

H & B AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

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Opening and Picking Machinery

Card Room Machinery

Spinning Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

COTTON MACHINERY

1 and 4. These are inserted in place of the lease bands. The band that first appears at the front of the machine is, of course, the one inserted in the creel between the beams A1 and A2; the rod in Fig. 4 is inserted in its place and thus in this instance divides the warp into two equal sheets, all the yarns from the bottom beams being above the rod, while all the yarn from the top beams comes below the rod. When the second band appears, the rod m1 is inserted in its place and the band removed. This rod divides the ends of the beam A1 and from the ends of the beams A3 and A5. As the third band appears the rod m3 is inserted which will divide the ends of the beam A2 from the ends of the beams A4 and A6. The rod m2 is inserted in the place of the fourth band and divides the ends of the beam A3 from the ends of the beam A5, while the rod m4 is inserted in place of the fifth band and divides the ends of the beam A4 from the ends of the beam A6. In this manner the warp is divided into sheets that are arranged in the same order as that given in describing the manner of gathering the yarn from the section beams, the sheets from the three top beams being beneath the sheets from the three bottom beams.

From the split rods the yarn passes to the expansion comb n, Figs. 1 and 4, which divides it into from 300 to 500 groups of ends, preferably with the group in each dent containing only one end from each section beam, and never more than two from each beam. Combs of the spring expansion type or the position expansion type are used, but the spring comb is not advisable for sets finer than 10 dents to the inch. Neither do I consider the spring comb satisfactory for use on head ends more than 12 inches wider than regular. The positive expansion should be used under these conditions. It is much stronger than the spring comb and has a far wider range.

By means of the comb the sheet of warp is effectually separated into its original condition of individual threads. Another object of the expansion comb is to guide the yarn onto the loom beam in such a manner that the outside ends will lie just within the beam heads and not be crowded which would cause a hard ridge at both ends and be detrimental to good weaving. It is necessary, therefore, to regulate the expansion comb each time that a loom beam with a different space between the heads is run.

The expansion comb used on the slasher is similar in construction to the expansion comb found on the warper and needs no detailed description here. There is no standard number of dents per inch for these combs, the range being from 7 to 11 according to the counts of yarn intended to be run and whether the slasher is intended for a large number of ends.

[This is the second article of a series by Mr. Nanson on slashing cotton warps. The next will appear in an early issue.—Editor.]

The National Aniline & Chemical Company, Inc., has issued a new edition of their "Dyer's Formulas" for use in connection with the 1921 Fall Season Shade Card of the Textile Color Card Association of the United States, Inc. This interesting booklet takes the standard colors decided upon by the Textile Color Card Association and gives the necessary recipes for matching these shades. Formulas are given for fifty-six dyeings on silk, fifty-six on cotton and sixty-eight on wool. In addition, the book contains general information as to the methods of dyeing

FACTORIES AND WAREHOUSES

RE-INFORCED CONCRETE CONSTRUCTION

ARTHUR TUFTS COMPANY

CONTRACTORS AND ENGINEERS

ATLANTA, GA. BALTIMORE, MD.

Made-in-Carolinas Exposition.

The Made-in-Carolinas Exposition, which opened in Charlotte on Monday, September 12, proved itself to be a success in every way. During the convention of the Southern Textile Association in Charlotte on September 16 and 17, quite a number of the visiting mill men took the opportunity of seeing this demonstration of the progress that is being made along manufacturing lines in the two Carolinas, in their own field, textile manufacturing, and in other lines of production, some of which the mill men never imagined were being pursued right in their own states. It might be mentioned that complimentary tickets to the Exposition were distributed by the committee of Charlotte textile interests at the "Dutch" supper on Friday night, and perhaps the largest representation of textile visitors were at the show on this date.

It was stated that there were over two hundred and fifty manufacturers of North and South Carolina represented at the Exposition with exhibits, and that in these exhibits more than three thousand separate and distinct manufactured products were shown.

This exhibition was a success not only from the standpoint of displays, but also from an educational standpoint, as it was both interesting and instructive to study the three thousand products of these two states which were on display. Holiday was declared on Friday of the first week by the Charlotte schools, and thousands of school children visited the Exposition. Other schools in nearby towns followed this example, and it would be indeed difficult to measure the value accruing from the impression that the coming generation, and those just starting out, received from this enormous representation of "home-made" products.

Textile manufacturing plants and textile machinery were well represented among the exhibits, inasmuch as the Carolinas section is the heart of the southern textile industry.

Mill owners from both states arranged many attractive booths, and showed to distinct advantage the great amount and variety of cotton goods made in North and South Carolina.

Southern Spindle & Flyer Company, Charlotte, N. C., had an exhibit showing the various products manufactured at this company's plant in Charlotte,, including spindles, and flyer pressers, and other textile accessories. This exhibit was in charge of W. H. Monty.

Parks-Cramer Company, Fitchburg, Mass., and Charlotte, N. C., were exhibiting their humidification systems. A feature of their exhibit was a water motor that can be substituted for the electric motor for operating the humidifier heads.

The Terrell Machine Company, Charlotte, N. C., had on exhibition in their space some miniature models of their "Utsman" quill cleaner and of the bobbin stripping machine which they manufacture.

The Jordan Manufacturing Company had an exhibit of their bobbins and skewers, etc. The products displayed were made from North Carolina maple, and were manufactured at Toecane, N. C., where the No. 2 plant of this company is located. A. D. Roper, assistant secretary of the company, was in charge of the exhibit. This concern was established in 1899, and the main plant and home office of the organization is located at Monticello, Ga.

The American Yarn and Processing Company, a consolidation of the Adrian Mill, the Alsace Mill, the Nims Mill, the Woodlawn Mill and the American Processing Company, of Mt. Holly, and the Union Mill at Maiden, had an interesting exhibit of the fine yarns manufactured and mercerized by them, and their exhibit also included samples of hosiery and underwear manufactured from these yarns. J. M. Hatch, secretary of the company, and general manager of its properties, was in charge of this exhibit.

The Cocker Machine & Foundry Company, of Gastonia, N. C., manufacturers of textile machinery, had in operation at their space a ball warper and long chain warper and other textile machinery. They also had exhibited manufactured cotton products made on machinery supplied by them.

The chain of mills controlled by the Gray-Separk interests of Gastonia had an exhibit of the fine yarn products which they manufacture. These interests operate the Gray Manufacturing Co., Arrow Mills, Inc., Parkdale Mills, Inc., Flint Manufacturing Co., Arkray Mills, Inc., Arlington Cotton Mills, and Myrtle Mills, Inc.

The Spindale Mills, the Spencer Mills, the Elmore Company, the Cleghorn Mills, and Parsley and Tanner, Inc., all of Spindale, N. C., had exhibits.

The Phoenix Mills, Kings Mountain, N. C., had a display of table linen, and the Pauline, Margrace and Patricia Mills, of Kings Mountain, were showing a joint display of table cloths, bed spreads and napkins.

The Arcade Cotton Mills, the Aragon Cotton Mills and the Blue Buckle Cotton Mills, of Rock Hill, S. C., and the Baldwin Cotton Mills, at Chester, S. C., were represented in a joint exhibit. Samples of the print cloths, cord madras, poplins, oxfords, sheetings, bag cloth, yarns, industrial denims, etc., manufactured by this chain of plants were on exhibit. The output of these four mills is one million yards of cloth a week.

A loom weaving ginghams was in operation at the booth of the Highland Park Manufacturing Company, of Charlotte.

The Victoria Cotton Mill, Rock Hill, S. C., was showing the various grades of ginghams and colored prints made at this mill.

The display of the Mayo Mills, of Mayodan, N. C., and the Arista and Washington Mills, of Winston-Salem, N. C., included an exhibit of sheetings, dress goods and knitted underwear.

The Roberdel Manufacturing Co., and the Pee Dee Manufacturing Co., of Rockingham, N. C., were showing a display of ticking, ginghams and plaids.

Exhibits of knitted products were numerous and varied. The P. H. Hanes Knitting Co., of Winston-Salem, N. C., exhibited samples of a complete line of knitted underwear for men and boys. The Maline Mills showed knitted underwear, skirts and hosiery.

The Waldensian Hosiery Mills, the Martinat Hosiery Mills, the Pauline Hosiery Mills, and the Valdese Mfg. Co., of Valdese, N. C., exhibited an attractive display of their products.

Other textile exhibitors included the following: Statesville (N. C.) Cotton Mills, McAden Mill McAdenville, N. C.; Imperial Mills, Chronicle Mills, Majestic Mfg. Co., Climax Spinning Co., and National Yarn Mills, of Belmont, N. C.; Taylor Knitting Mills, Hickory, N. C.; Fidelity Hosiery Mills, Newton, N. C.; Leaksville (N. C.) Woolen Mills; Armstrong Mills, Gastonia, and Rankin Mills, Gastonia, N C.; and the McLean Manufacturing Co., Bessemer City, N. C.

Notes About Men You Know.

A. SAM WHITE, who has been superintendent of the Clayton Cotton Mills, at Clayton, N. C., for the past twenty years, has resigned and has gone to High Point, N. C., as superintendent of the Highland Cotton Mills at that place.

B. S. PIPER is the superintendent of the Western Reserve Cotton Mills of Ga., formerly the Quitman Cotton Mills, at Quitman, Ga., which were recently taken over by the Mason Tire & Rubber Company, of Kent, Ohio, for the manufacture of cord tire fabrics. Mr. Piper, who was formerly located in the South, has for the past fourteen years been out of this section. For a time he was overseer of weaving in the textile division of the Mason Tire & Rubber Company, at Kent, Ohio, and for the last year has been superintendent of the cord fabric department of the Beaver Mills, at Waterford, N. Y. He assumed his duties at the mill in Quitman on September 5.

CLIFFORD BARNES has accepted the position of overseer of weaving at the Exposition Cotton Mills, Atlanta, Ga., succeeding W. P. Hogue, who recently resigned. Mr. Barnes was formerly at the Columbus (Ga.) Manufacturing Company, where he held a similar position.

W. Y. HARRISON has resigned as superintendent of the Covington (Ga.) Mills.

WILLIAM SULLIVAN has been promoted from overseer of carding to superintendent at the Covington (Ga.) Mills, succeeding W. Y. Harrison, resigned.

D. JOLLY has been promoted from overseer of weaving to assistant superintendent at the Lanett (Ala.) Mills, J. J. Hyder, formerly overseer of weaving at the Social Circle (Ga.) Mills, now holds that position at the Lanett Mills.

W. G. REYNOLDS has accepted the position of superintendent of the Eastern Manufacturing Company, Selma, N. C.

RAYMOND JACKSON has resigned his position with J. E. Sirrine & Company, Greenville, S. C., and accepted a position with Isaac Hardeman, sales engineer, Charlotte, N. C. Mr. Jackson is a son of Frederick Jackson, southern representative of the Universal Winding Company.

W. S. MCNAB, who has been one of the southern representatives of the Atlantic Dyestuff Company since the opening of that company's southern office in Charlotte, N. C., has recently resigned his position with that company to accept the position of southern representative of the Quaker City Chemical Company, of Philadelphia, importers and manufacturers of soluble oils, soaps and softeners. Mr. McNab is a practical dyer and finisher, and expects to render service to the southern trade by demonstrating the products of his company in the various mills. He will continue to make his headquarters in Knoxville, Tenn.

T. G. GLENN has been appointed manager of the Ottaray Mill, Union, S. C., succeeding D. N. Jones.

J. R. WOODS has been promoted from overseer of spinning to superintendent of the Roswell (Ga.) Manufacturing Co.

L. M. ODELL has accepted the position of overseer of carding at the Dilling Mill, Kings Mountain, N. C.

J. E. COPLIN, formerly with the Muscogee Mfg. Co., Columbus, Ga., has accepted the position of superintendent of dyeing at the Deep River Mills No. 1, Randleman, N. C.

L. N. HARRIS has accepted the position of overseer of spinning in the Norris Cotton Mills, Cateechee, S. C.

W. A. MORRIS has been promoted from overseer of carding to assistant superintendent at the Courtney Mfg. Co., Newry, S. C., and in that position will have charge of the night operation of the plant.

WILLIAM JENKINS has become overseer of weaving at the Drayton Cotton Mills, Spartanburg, S. C.

D. C. JONES has succeeded W. O. Jones as overseer of weaving at the Laurens (S. C.) Cotton Mills.

A. D. CREECH succeeds A. Sam White as superintendent of the Clayton (N. C.) Cotton Mills.

WILLIAM HOWORTH has resigned as superintendent of the Waxahachie (Texas) Cotton Mills.

W. D. BALLARD, who has been superintendent of the Lone Star Cotton Mills, at San Antonio, Texas, has become superintendent of the Waxahachie (Texas) Cotton Mills, succeeding Mr. Howorth.

FRANK E. HEYMER has accepted the position of superintendent at the Bradley Manufacturing Company, Columbus, Ga., formerly the Hamburger Mills. This position was recently resigned by C. W. McNealy.

Preparatory Mathematics.

A large number of continuation and evening school students, who wish to take up the textile or other technical courses at the mill schools or in home study work, are deficient in the knowledge of certain fundamentals of elementary mathematics. Most important of these are the rules and methods used in solving problems involving common fractions, decimals and square root. A short, yet thorough, review of these topics is necessary before such students can do satisfactory work, either in the mill or in the studies requiring more advanced mathematics.

There has been a need for an elementary book that would cover these phases of mathematics, and to fill this need "Preparatory Mathematics," a book of 70 pages, has been prepared by Harold B. Ray and Arnold V. Doub, instructors in the mathematics department, Cass Technical High School, Detroit. The materials and methods of this brief text book have been selected only after careful study, in the class room, of the needs of several thousand students taking a preparatory course in Cass Technical High School. Each discussion and exercise has passed the test of "selling itself" to the student doing individual work. The book contains sections on fractions, decimals, powers and roots, and roots of numbers. It is bound in cloth and the price is $1.00 per copy. The publishers are John Wiley & Sons, Inc., 432 Fourth Avenue, New York City, and copies may be secured direct from the publishers, or the book department of COTTON will be glad to order copies for any reader interested.

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STRAIGHT LINE METHODS

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Why Should this Work Be Uneven?

Editor Cotton:

I would like to ask a question of your readers in regard to uneven numbers. I am a card room man and have had quite a little experience, but lately we have gone on to double carded work at our mill, and since we have been doing this our weights vary quite a little.

We are running 1 1/16-inch peeler cotton, in the opening room the cotton and waste are mixed uniformly and our picker laps weigh uniformly. I make a 14-ounce lap on the finisher picker, a 70-grain sliver on the breaker cards and a 48-grain sliver on the finisher cards. We have no doubling of laps in creeling. The settings on the breaker cards are as follows: doffer to cylinder, 7; licker-in, 7; feed plate, 7; flats, 10; stripping plate, 29. The settings are the same on the finisher cards, except the flats are set to a 7 and the stripping plate is set to a 27. We have two processes of drawing, the weight of the sliver being 48 grains. The drawing frames are in good order, and the spoons are working all right. We have 12 x 6 slubbers, making a 1.42-grain hank roving; 9 x 4½ intermediates, making .50-grain hank roving; and 7 x 3 jack frames, making a .17-grain hank roving. We are producing number 30s yarn. No doublings on slubbers or speeders and no long splicing of ends in creeling.

This is our organization, and, as stated, our numbers are very uneven. I should like to hear from a number of men and have them give their opinion as to the way to remedy our difficulty. If there is any further specific information desired, I shall be glad to furnish it.

C. W. (N. C.)

How Many Mills Record Belt Data?

Editor Cotton:

I notice "M. W. H. (Mass.)" in his letter on "Care of Belts in the Card Room," page 717, July Cotton, calls special attention to the fly being drawn to the belt by the air current set up by the belt and adhering until the face of the belt is covered, and that the slippage increases in proportion to the thickness of the fly.

I would like to ask "M. W. H.," or any of your readers interested in securing efficient production, if he has definite data as to the amount of belt slip occurring as the fly builds up on the face of the belt, and what he allows as slip or difference between the theoretical speed the driven pulley should run according to driver and driven ratio and the actual operating speed before scraping is necessary? It would also appear essential to have the amount of "pick up" or the increase "M. W. H." secured by applying the dressing and how closely he approached the theoretical speed after each application, on starting up Monday morning.

Has "M. W. H." or any of your readers kept speedometer readings (the facts would be vitally interesting) of loss in speed as fly builds up and dressing is applied and when the belt is cleaned? Have any of your readers the data of theoretical speed and actual speed for the new bicycle spinning frame drive, and how long same was maintained and what loss in speed occurred before the belt was taken up?

How long, with ordinary care, does he expect a belt to run before the oil is "spattered on" and at what loss in speed has he found it to be necessary to clean the belt and tighten it? Does he keep tachometer records or is he entirely guided by general percentage of slip and output? What is the daily drop? At what percentage of slip does the output of the frames begin to show in the daily production?

What method does "M. W. H." use to tighten bicycle belt drives and make the laps, and what tension per inch width would he recommend to secure the speed ratio and not endanger hot bearings? "Attention to belting is especially important," but has any one the facts and data by which they are guided; of course the conditions vary, but the general results given in percentage would be of great value to all your readers who are daily meeting these problems.

C. L. S. (New York.)

More About Card Drafts.

Editor Cotton:

The letter entitled "What Is the Best Card Draft?," written by "A. B. C. (R. I.)," which appeared in the August issue of Cotton, is to my mind the most important communication that has appeared in the Practical Discussion Department for some time. I hope that every reader will give his views on this important subject. "A. B. C." is dead right when he stated "and there are many carding departments that suffer tremendously because of this inattention."

Speaking of card drafts and the way they are ascertained, "A. B. C." continues, "This, claim some mill men, being

determined by the length of staple and grade of cotton being used, and I find upon inquiry that there is no other reason than this one for the amount of draft used in many cases."

There is another reason which is most important, and that is the length of time the hanging downward fibers are exposed to the action of the licker-in teeth. At this point, let us consider the structure of the cotton fiber, its hollow spiral or collapsed tubular form, with its delicate waxy walls that are injured by unduly severe treatment. If the readers want a surprise, when clothing a cylinder, when the cylinder is stripped of its clothing, let them run a portion of a sheet of lap through the licker-in only, and then examine the stock. It will be found that the licker-in does not give that combing action we read about.

We have seen all kinds of devices from the series of licker-ins at the back of the card to the "fancy" in back and in front of the card, and why were they ostracized? Because it was discovered that the juggling of the fibers on sharp pointed wires stripped the waxy walls from the fibers, and for this reason, the single licker-in gives the best results. For the same reason, 120 inches of a draft is the limit on a cotton card.

Some reader may say that there is nothing to the foregoing, and that it is all theory. Then why do we scatter the waste from the card room over the mixing? Would any carder dare make a lap of card waste only? Of course not. Then the card action does rob the fibers of their waxy walls. As stated in my answers to "J. S. B." in the July number, "The more rapidly the work can be gotten from the card consistent with the quality or grade of work required, the stronger the yarn."

Many carders run a 14-ounce lap which of course exposes the fibers to the licker-in teeth for a longer period, and after this severe treatment they are not as cohesive. The result is that more twist must be inserted, in both the card room and the spinning room.

It is a mystery why so many mill men claim they are puzzled by what has been accomplished, and still remain in the same old rut.

The thing to do is to run light laps on one-half the cards and run the roving made from the light laps on certain ring frames or mules. The difference will be noticed on the fly frames if the proper drafts are used preceding the fly frames. All practical carders must admit that there is no combing action from the bite of the feed plate to the cylinder, even at this point the stock is removed from the licker without any resistance, and the stock is conveyed to the flats and here the fibers receive their first combing. Therefore, in order to have good carding, we must adjust the draft so as not to crowd the cylinder or flats, and the same rule holds good at the back of the card. That is why I have always advocated an 11-ounce lap, and if any carder is unable to make an 11-ounce lap without a sheet of lap full of holes, I think he had better resign and get out of the business, for I have run no other standard lap in the past 25 years.

Again referring to the remarks of "A. B. C.," after considering the picking process and its cleaning abilities, that writer declares, "the next cleaning operation surely takes place in the card, and by all means must be finished properly by that machine or doom is written upon every inch of yarn that is finished." Can there be any argument against this statement?

There are certain kinds of cotton that require a long draft, for instance, "knitted" stock, but the fibers are weakened from too long an exposure to the licker-in teeth. It is impossible to have a long draft on the card without taking the life out of the stock. It is the law of compensation. To make a strong yarn, very clean stock is first necessary, and this, aided by a light sheet of lap and a short draft, produces work of an excellent quality.

It is with regret that I must disagree with "A. B. C." when he makes the statement that, "If we allow the feed roll to be operated fast, which is the case when we apply a short draft to the whole machine, we increase the strain upon the wire of the cylinder to a terrible degree, for by feeding a bulk against the cylinder means to crowd a large bulk between the back plate and the points of the wire on the cylinder, and it is there that many cylinders are loosened and many card rooms are ruined because of this terrible strain upon the fabric of the clothing." I fail to see where any terrible strain can take place at the point mentioned if the weight of the sheet of lap is reduced correspondingly to the increased speed of the feed roll. In other words, reduce the weight of the lap and increase the speed of the doffer correspondingly and the same production will be gotten from the card, but of a better quality.

I agree with what "A. B. C." has to say in the seventh paragraph of his letter, but it is up to the carder to be on guard at all times and not have such conditions occur.

Again, I am unable to agree with "A. B. C." when he states in the tenth paragraph, "The bulk of cotton being held directly between the lower center of the feed roll and the upper surface of the feed plate assures the experimenter that no fiber can possibly be broken or chafed." No fiber can possibly be broken, but they are chafed under the best of conditions. I have already stated the reason.

What "A. B. C." states in the eleventh paragraph is dead wrong, in my opinion. What is said can be applied to the sheet as a whole, but not to the individual fiber. The licker-in saw-toothed fillet is inserted in spiral grooves, so that a tooth will not strike the fringe of cotton exactly where the previous one struck. This peculiar construction of the licker-in fillet gives a slight angular position to the fringe of fibers hanging downward, and, as stated, the same tooth does not strike the same fiber. Let "A. B. C." stop any cotton card and remove the cover over the licker-in and then try and count how many fibers there are in the single groove.

Another proof that the fibers are taken from the feed roll collectively is in the fact that a portion of lap is often plucked from under the action of the feed roll. Let a lap run out and watch this occur in almost every case.

The licker-in teeth play through the fringe of fibers hanging downward at a very high velocity. The number of teeth that pass the nose of the feed plate while one inch of cotton is delivered is about 2,000,000. From this it should be seen that running a light sheet of lap is of much benefit to the work throughout the mill, because there are fewer fibers to the inch to be acted upon, and although as many fibers are presented to the licker-in, it must not be forgotten that it is much harder to extract the foreign matter from a heavy bulk of cotton, besides, when a lap is heavy, the amount of fibers to be acted upon is not the only thing to

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FACTORS

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be considered, the injury to the fibers being the most important.

In the 14th paragraph, "A. B. C." says, "More cleaning and more polishing means stronger and more lustrous yarn and cloth," but take it from me, more cleaning and more polishing means *weaker* yarn and more lustrous yarn and cloth, and I believe the carders will back me up on this point.

The more a fiber is polished, the weaker it becomes. Close settings mean cleaner yarn, but weaker, while if the settings are made wider, the product is a dirty yarn, but stronger. There can be no argument on this point, for it has been demonstrated by builders for years.

But these remarks are but the opinion of one man. Let us hear from other carders. Wash (Conn.)

Editor Cotton:

I noticed in the July number of Cotton, in answer to the questions of "J. S. B." in the May issue, that "Wash (Conn.)" advances the theory that if "J. S. B." would run a lighter lap his card would last longer as far as the clothing is concerned. "I'm from Missouri." Besides, every mill isn't so arranged that they can run 30, 40 or 50 grain slivers, or slivers to suit their fancy. Let us give "J. S. B." a fundamental rule to go to perfection with his 65 grain sliver.

"Wash's" method suggests that he lighten the lap. In so doing, what happens at the feed roll? Is it not speeded up to hold the card sliver at the same weight? And if so, isn't the same bulk delivered to the licker-in? And has it not been delivered to the licker-in faster? And when such action takes place does the licker-in have such a good chance to clean the foreign matter from the web or tuft of lap?

I think "Wash" will agree that if the feed roll has been speeded up to hold the sliver to the same weight, and this action has been brought to pass because he has suggested a lighter lap, that the cotton on the cylinder is in the same state as far as quantity is concerned, only just that much dirtier. Isn't that true? "J. S. B." wants to know a remedy; why suggest more trouble?

Would it not be better for "J. S. B." to increase his total draft to say 124 inches and then run a lap to give him that extra carding or combing with the licker-in and hold the sliver to 65 grains for his production? If "Wash's" claim is that work should be gotten from the card quickly to secure quality and high grade work, then how does he account for a certain high standard mill in his locality that is obtaining a higher standard in both quality and strength by increasing their draft to 140 inches, which shows that the cotton was in the card nearly 50 per cent longer than it would have been with the draft he suggests for "J. S. B." How come?

"Wash" will also agree that good work can be had from a 65 grain sliver from a card, providing the lay-out behind that process is correct. I have run an 18-ounce lap, and you never saw nicer, stronger yarn in your life, and together with that we ran a 75 grain sliver off the finished drawing frames. If a man must run certain weights it can be done, only, he should be directed to get the best with what he has to do with. I will agree that it isn't always handy to handle such bulky slivers, but some of us must

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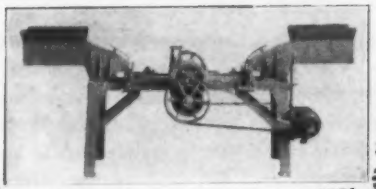


GET THE VISION

Those men who have the eyesight of a hawk and the vision of a clam say there is a panic billed for this Fall.

There was no panic when interest rates hovered around 8 per cent. How is it going to take place now when every line of business is fast approaching normal?

What is needed is Vision. Those who have it, see that prosperity is with us. That it is not necessary to wait for better business conditions. THEY ARE HERE.

The question is, are we going to sit around and wait for something to turn up, or are we going to start something?

Competition is going to be keener than ever. It's up to all of us to cut costs to the core. When we say cutting cost, we do not mean cutting off. We mean cutting cost by installing time and labor saving machinery.

THAT'S WHAT 260 TEXTILE MILLS IN THE UNITED STATES AND CANADA HAD IN MIND WHEN THEY INSTALLED ONE OR MORE "UTSMAN" QUILL CLEANING MACHINES.
WHY DON'T YOU DO THE SAME?

The Terrell Machine Co., Inc., Charlotte, N. C.

do it. This silver spoon stuff is given only to a certain few.

If "J. S. B." can see an opportunity to lighten his sliver to 50 grains and speed his doffer in ratio to the decrease in sliver, it will be far easier for him to handle the 50 grain sliver at the drawings or sliver laps, whichever he has, than it is with the 60 grain sliver.

Again, if "Wash" would like to see some nice work let him try this: Take one of the cards, put a 15.3-ounce lap into it, some of those nice laps coming from the pickers, put a feed gear on to give 140-inch draft, take out about 6 per cent waste, and get a 45 grain sliver, speed the doffer up to get the required production. If after doing this "Wash" doesn't see a decided change for the better everywhere in his carding, then let him tell us about it in these columns. I want to know about it. If he doesn't get it the way I predict, let me tell him where his trouble is.

If "J. S. B." will allow me to make a suggestion regarding his carding, I should say that in the neighborhood of 85-inch draft is very poor and doesn't aid in the solution of good carding. Let him go over 100 inches, anyway, and to 140 inches, if possible. He should not get the lap so heavy that the feed roll won't hold it, for then he will be in trouble, but he should lengthen his draft until his feed roll will stand no more. He should also remember to keep a little on the safe side, because a feed roll will spring a little in the center, and if the bearings are not free, it will skip a little.

Here's hoping "J. S. B." gets over his trouble, and that "Wash" will get the best carding he has ever had with the 140-inch draft. And I hope, too, that "Wash" will tell us in these columns all the good things that were derived from the extreme on the long side of carding. Tom (Mass.)

Thin Lap Preventer for the Breaker Picker.

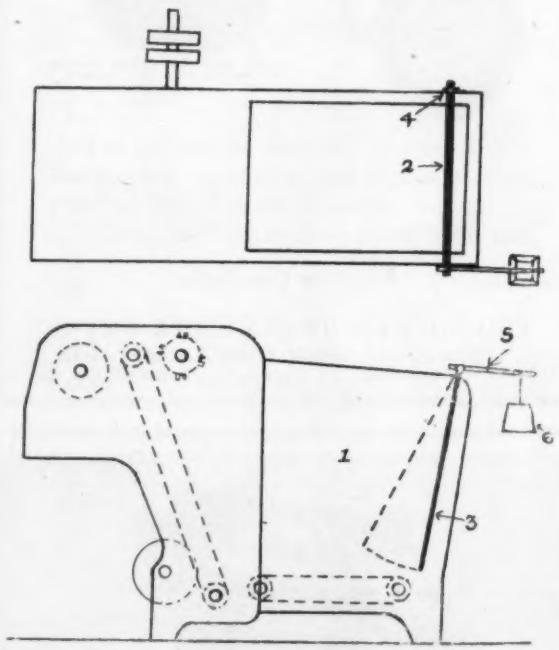
EDITOR COTTON:

There has lately been quite a lot of discussion among carders on the different methods of opening and of feeding the cotton into the hoppers. At the Columbia meeting of carders, where this matter was brought up, I exhibited a small model of a simple device which I have applied to my breaker hoppers and which has helped me wonderfully in getting evener and better running work, and in the hope that it will be of assistance to other carders, I am herewith passing it along to your readers.

The accompanying drawing, showing a side view and a top view of an ordinary Kitson picker hopper, illustrates how this proposition is arranged. In this sketch, 1 is the hopper of the picker. A one-inch rod, 2, extends across the top of the hopper and is supported on both ends by stands, 4, bolted to the frame, which hold the rod in place and allow it to swing freely. To this rod is fastened a piece of sheet metal, 3, extending across the width of the hopper and of such a length that it reaches almost to the slat apron at the bottom of the hopper. This sheet metal back is riveted to three or four ⅜-inch rods extending from the rod, 2, to the lower edge of the metal back, and spaced equally across its width. An 18-inch lever, 5, is fastened at one end to the rod, 2, and contains several holes in the other end, spaced about two inches apart. The 10-pound weight, 6, is placed in any of these holes, according to the pressure desired on the bulk of cotton in the hopper.

The working of this device is readily understood. This oscillating "false back," as it might be called, is held against the cotton by the weight at all times, and thus keeps a certain amount of cotton pressed against the spiked apron continually. It doesn't matter whether the hopper is full or half-full; it keeps the same amount against the apron at all times, regardless of the amount of cotton in the hopper.

Everybody knows that in the ordinary hopper, where we have only the little slat apron at the bottom to depend upon to furnish cotton to the spiked apron, when the hopper is full of cotton the breaker laps will run heavy, and then if a negligent operative allows the hopper to run nearly empty, the laps will come out light. Thus, by leaving it solely in the hands of indifferent and inexperienced tenders, we have the result of breaker laps of different weights. When there is a big variation in the breaker laps, naturally the intermediate cannot do its duty as it is overworked, and so on to the finished lap. I have never seen a card room that depended on hand fed hoppers that was not bothered more or less with uneven laps.



However, this simple device which I have attached to the hoppers of my breaker pickers has done away with at least two-thirds of my lap variation, and I feel sure that it will be of benefit to any mill that will try it. I am using it right along to great advantage, and through its use am not bothered with thick and thin laps. And I might add that since I have been using this device on our machines, we have had no changing of gears on account of uneven work.

I would like to have other carders try this proposition out. It is simple, easy to attach, inexpensive and will never get out of order. I hope that if any of your readers adopt this proposition, they will let us know how it works out through the columns of your magazine.

J. H. Y. (Ga.)

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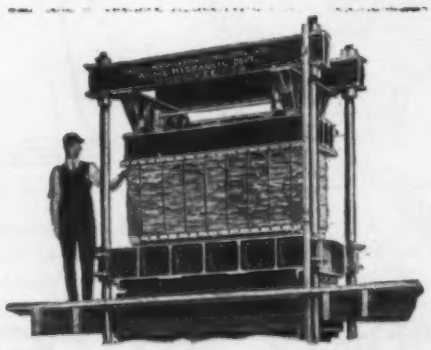

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A New Band Tying Gauge.

Editor Cotton:

It has long been known to the textile industry through extensive experiments that if it was practical to band a spinning frame with an average band pull or tension of two pounds, the minimum amount of power would be required to run the machines, and at the same time excessive band slippage would be eliminated. This would result in uniform twist, and spindle wear and band consumption would be materially reduced.

The following table, showing spindles per horsepower, was compiled by the Draper Corporation:

1	pound average pull	73 spindles per hp.
1.5	pounds average pull	69 spindles per hp.
2	pounds average pull	65 spindles per hp.
2.5	pounds average pull	62 spindles per hp.
3	pounds average pull	59 spindles per hp.
3.5	pounds average pull	55 spindles per hp.
4	pounds average pull	52 spindles per hp.
4.5	pounds average pull	50 spindles per hp.
5	pounds average pull	47 spindles per hp.
5.5	pounds average pull	45 spindles per hp.

The advantage of the band tying gauge, illustrated, and which is a comparatively recent invention, lies in the fact that an even tension of two pounds can be applied to the band by an operator and in fact any desired tension can be applied from one up to twenty pounds. The Draper Corporation, through many experiments, have determined that two pounds is the right tension for the best results.

The drawing at Fig. 1 shows the construction of the device. A set of four of these is sufficient for a frame or even one operator using one of them can travel down the frame adjusting the tension for each spindle. The operator applies this device to a spindle and instead of pulling the band on the whorl, as is the custom at present, he applies it to

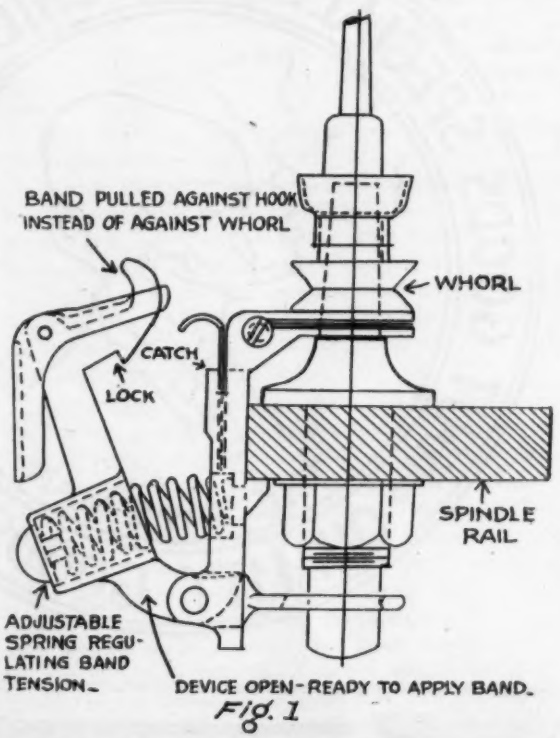
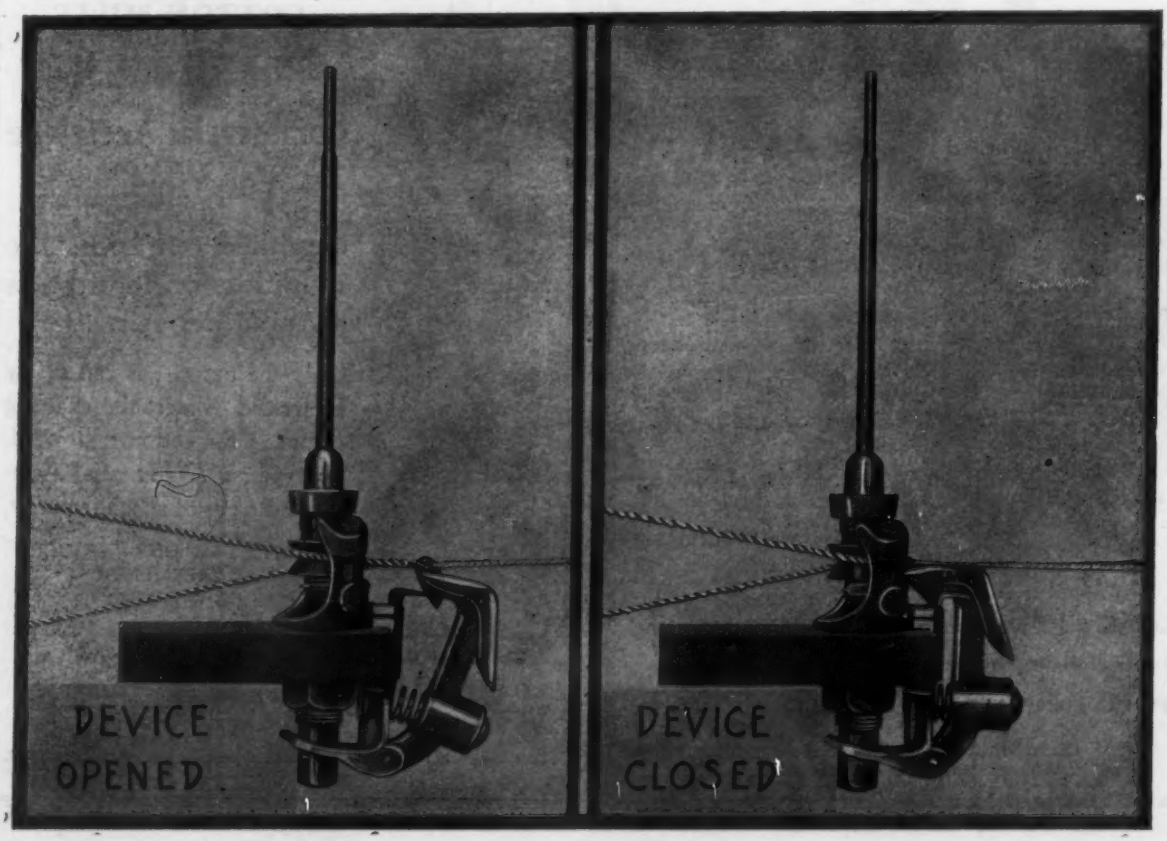


Fig. 1



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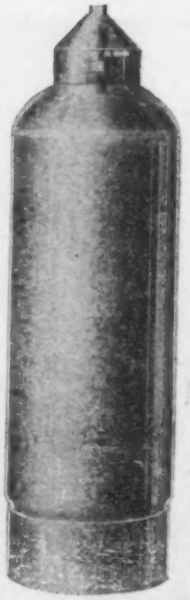

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the device and as his band tightens the device moves forward against the resistance of the spring and locks it at a predetermined tension, after which he ties his final knot and mechanically doffs the band upon the whorl. The device is then removed and the operator is ready for the next spindle.

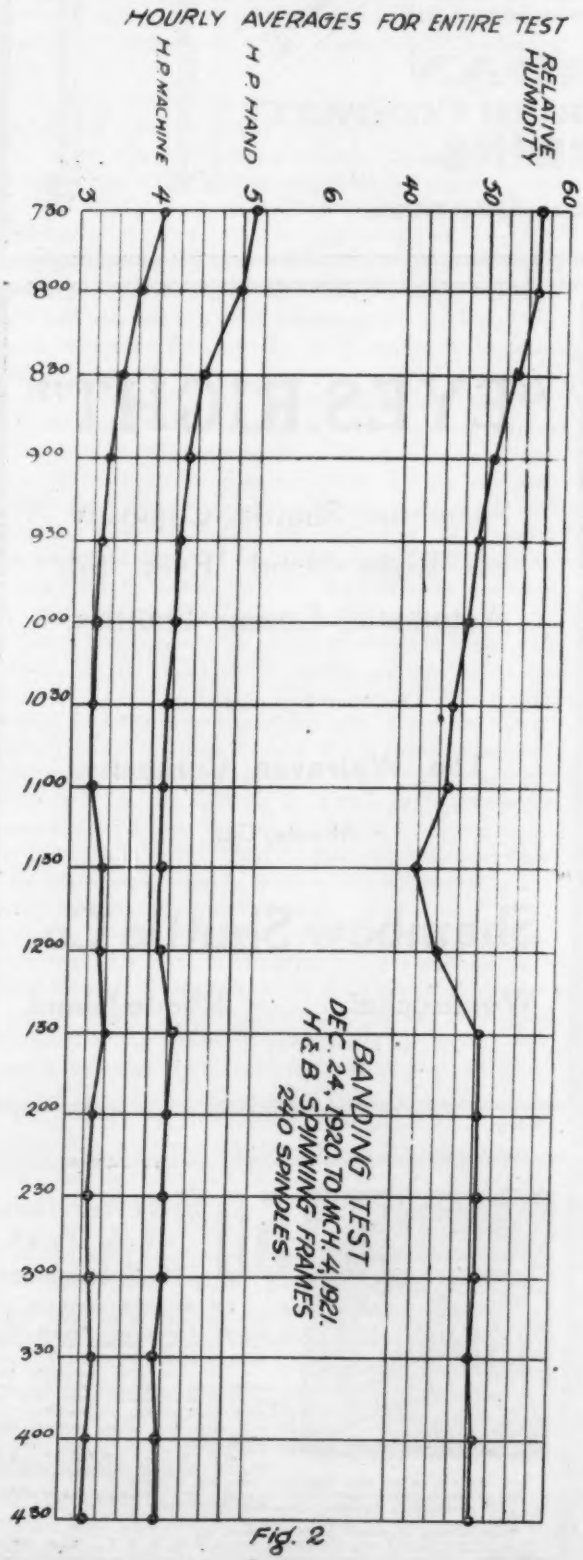


Fig. 2

The drawing at Fig. 2 shows the curves made from a test of eight H. & B. frames, 1⅝-inch ring, 240 spindles each; that the difference in horsepower runs from 3¼ to 4 horsepower on the machine banded frames and from 4¼ to 5⅛ horsepower on the hand-banded frames, in relation to the humidity curve shown in the same sketch.

With maximum humidity in the room the horsepower was 3.9 on the machine-banded frames and 5.3 on the hand-banded frames.

With minimum humidity, the horsepower was 3.25 for the machine-banded and 4.06 for the hand-banded frames.

The test showed 50 per cent less banding used on frames banded by the machine, because they were put on at a less tension than was the case in the hand banding. Daily, throughout these tests the spindle speeds were checked up with the result that on the machine-banded frames the maximum speed was 8,000 r.p.m. and the minimum 7,900 r.p.m. On the hand banded frames the minimum was 7,900 r.p.m. and the maximum was 8,200 r.p.m.

In an analysis of the power consumption from tests made by the Draper Corporation and shown in their book, "Textile Texts," it was found that 50 per cent of the power consumed was taken up by bands and bare spindles. A tight band adds to power consumed. After extensive experiments and tests it was found that an average band tension of two pounds will consume the minimum amount of power and at the same time it will assure positive twist.

The humidity factor is a big one as regards the tension to be applied to the spindle. Too much humidity causes the yarn to absorb moisture to such an extent that it will break. If the tension is no more than two pounds, the moisture absorbed by the yarn will not break the yarn because the tension on the yarn in the first place is not too great.

Watching an operator apply a spindle band by hand, it is readily seen that it is impossible for him to apply even tension to all spindles by such a method and too frequently the tension is too great and too varied up and down the frame. A device that will insure an even tension under all conditions will prove a boon to the industry and will eliminate many losses and consequently improve the efficiency and output of the machine.

The two photographic reproductions show the device in an open and closed position. A band pull of thirteen pounds is necessary to close the device, but after doffing the band upon the whorl the tension there is only two pounds which is the correct amount that should be applied. The device is removed by the operator after the band is applied to the spindle and the operator moves on to the next spindle. After a little practice the operator is able to work fast as he knows that the device applies the proper amount of tension every time and equally to all spindles.

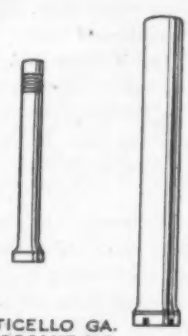
W. A. K. (Maine.)

Cards and Card Clothing.

Editor Cotton:

I am convinced from observation that a great many carders do not stop to consider why we set a card as we do to obtain the required results, or why we use the different counts of clothing.

A card looks simple, yet it is more complicated than many realize. The different parts were not put in their



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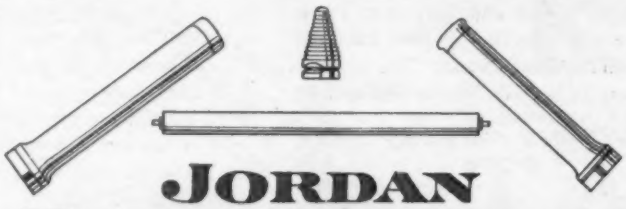

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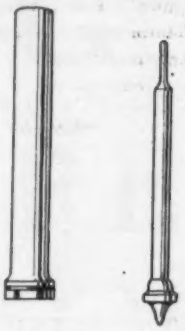

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respective places by mere chance, but after a careful study of each part and its relation to the whole. We find, from careful study, that each individual part has functions peculiar to that part, and yet when combined they form one harmonious whole which does more in the cleaning, straightening and attentuation of the cotton in the course of manufacture than any other machine, and should any part fail to function properly the result is a poorly finished product or cloth.

It is not enough to know that if a card is set a certain way we will obtain certain results, but we should also know why we are able to obtain those results. It is not only the mechanical parts that must be considered, but also the forces and air currents generated by those parts, the atmospheric condition of the room and the stock being used.

How much we can tell of the condition of the stock and what is required to handle that cotton properly, from the mere look and feel of a small sample, is very important, yet it can be acquired only by years of experience in the handling of the cotton fiber.

As it passes from the lap over the nose of the feed plate, the cotton comes in contact with the saw-tooth surface of the licker-in, which combs off the fibers. The centrifugal force of the licker-in drives the motes or large seed out, while the centripetal air currents passing through the card carry the fibers forward on the surface of the licker-in. The centrifugal force of the licker-in causes the fibers to radiate from its surface, therefore the ends come in contact with the mote knives and later with the screen.

Let us here consider the setting of the mote knives and screen. The knives are two in number and require different settings for the different grades of cotton. I will only consider the American cotton at this time. I find that should I set my knives too close the seed will be broken, therefore I set my first knife to a 17 gauge from the licker-in and my second to a 12. By so doing I get that gentle process in cleaning which is necessary in the making of strong yarn. The screen is set farther from the licker-in at the nose than at the blank part. Why? It causes the air current to become stronger as the fibers proceed.

As the fibers come above the top of the licker-in screen, the centripetal current of the licker-in is released and shut off by the back knife plate, which is set nearer the licker-in and farther from the cylinder, causing the centripetal air current of the cylinder to predominate and transfer the fibers to its surface. The same forces here cause the fibers to adhere in a like manner as at the licker-in.

As we follow the fibers and watch them come in contact with the flats, we notice that there is a V-shaped space between the cylinder and each flat. If we examine the flats we find that the face which rests on the flexible bend is 1/16 of an inch lower at the heel than at the toe, therefore the wire on the heel will be that much nearer the cylinder. In grinding the flats we must see that the face of the wire is ground perfectly straight across in order to retain the given angle. The reason for this is to obtain the gentle process of cleaning and to not injure the fibers. In this manner the ends are combed first and then gradually the rest of the fiber. When combing your hair you do not start at the roots first. No, you take out the end kinks first, and we must give the cotton the same consideration.

We next come to the front knife or percentage plate. The plate here regulates the air currents as elsewhere. We can readily see that if the plate is set nearer the cylinder the centripetal air currents will be stronger, thereby holding the fibers more firmly to the face of the cylinder and less firmly on the flats. Therefore, we will obtain less strips and vice versa.

The fibers leave the cylinder and adhere to the doffer for the same reason that the cylinder screen is wider at the front than at the back, that is, it is about ¼ of an inch away from the cylinder at the end near the doffer, therefore the centrifugal force of the cylinder overcomes its centripetal air currents and deposits the fibers in an even sheet on the doffer which in turn delivers it to the coiler.

The matter of clothing is very important, but in order to select clothing intelligently, a man should know a card and its forces. There are three vital questions to be considered in the selection of clothing. First, what kind of stock is being run? Second, what is being made? And third, how much are the cards producing?

All these have a bearing on whether the clothing should be 90s, 100s, 110s or 120s. The more the cards are doing and the coarser the numbers of yarn and the lower the grade of cotton, the coarser must be the clothing.

The flat clothing should be 10 points finer than the cylinder to produce the best results. There are various reasons for this. The flats do not receive such harsh treatment as the cylinder. The cotton is opened better when it comes to the flats than when received by the cylinders. Here, again, we find the forces generated by the cylinder playing an important part. The centripetal air currents hold the cotton to the cylinder and the centrifugal force of the cylinder make the ends of the fibers radiate from its surface, both causing a severe strain to the clothing, tending to straighten and draw back the teeth. The main point is to have as many points per inch to the cloth as is practical with the work being run.

Now, the cylinder holds the fibers while the flats do the combing, therefore, if a nep comes up in the web the flats must either let go gently or break the fiber so we can see that, taking these various reasons into consideration, we can and it is advisable to use a finer flat clothing than on the cylinder, and we thereby gain our desired end of having more ends per inch and giving the cotton a gentler cleaning.

W. M. (Conn.)

The Thirty-Fourth Annual Edition of Davison's Textile Blue Book has been completed and is now ready for distribution. Seven hundred and eight new manufacturers have been added, while all mills out of business have been taken out. Thousands of changes in mill names, officers, goods made, equipment, etc., have been made and all lists have been brought up to date. All the usual lists and features are included in this edition. Besides the regular reports, a separate list of the new mills is shown, and a list showing all mills with dye houses is a valuable feature for chemical and dyestuff concerns.

Two editions are issued as formerly; the office edition of 1,900 pages, and the handy edition of 1,700 pages, containing all the information given in the office size with the exception of the classified directory of mills and textile supply directory. The salesman's directory lists all mills alphabetically rather than by classification. The volumes can be obtained from the publishers, Davison Publishing Co., 50 Union Square, New York City.

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THE ROESSLER & HASSLACHER CHEMICAL CO.
41st St. and Sixth Ave.
NEW YORK

Rosin in Bleaching.

EDITOR COTTON:

Will you please tell me through your "How Other Men Manage" department if rosin has any value as a bleaching agent? I would also like to know how it is used and what effect it has on the goods, or what the theory of its use is. I have heard of several bleachers who are using it lately, as a new thing, and have become quite interested in it. If it is any improvement I want to try it myself.

Bleacher (N. C.)

EDITOR COTTON:

Replying to "Bleacher," would say that the use of rosin in the ash, or soda, boil is an essential part of the bleaching of cotton goods by the liming proces, by which the goods are first boiled in milk of lime, then soured, washed and returned to the kier to be boiled a second time in soda ash, or caustic soda, and rosin or rosin soap. The liquor for a five-ton high pressure kier should be made up in a separate tank as follows: 800 gallons of water, 360 pounds of soda ash and 150 pounds of rosin; boil until all is dissolved and then run into the kier; the goods are boiled in this for 8 to 10 hours if high pressure is used. The fatty acids resulting from the decomposition of the lime soaps during the grey sour, also the brown coloring matters, are removed during this operation, the special feature being the action of the rosin, which greatly facilitates the removal of the fatty matters by exercising a purely mechanical action, the alkali present being then able more readily to saponify the emulsified fats, particularly those fats which have escaped the action of the lime boil. The writer has seen the goods come out of this boil absolutely white without any chemicking at all.

It has been found by experiment that after a lime boil, the most rapid saponification of a neutral fat spotted on a piece of calico is affected when boiling under a pressure of 30 pounds, 120 degrees C, by a solution containing 10 grams anhydrous caustic soda and 2½ grams of rosin per liter. Increasing the amount of the rosin did not hasten the saponification, but increasing the velocity of the circulation did.

It will be understood from the foregoing that when rosin is dissolved in alkali an alkaline "abeitate" or rosin soap is formed, which possesses no true saponifying properties but acts as an emulsifying agent.

Rosin soaps have very marked lathering and detergent properties, but their use demands very thorough washing with soft water if a good color is to be retained on the finished goods, and for this reason alone rosin soaps are avoided as much as possible in the textile industries. It is the opinion of the writer that the use of rosin in any form is objectionable in the case of fine goods, or those requiring a perfect white. If the water is hard, it is almost impossible to completely remove a rosin soap, and even with distilled water, it is difficult to remove it from the goods.

When the hardness of the water is due to calcium or magnesium salts the insoluble soaps formed by these with rosin are nearly all white when freshly precipitated but when dried into the cloth they often develop a yellowish or brownish color which becomes darker by age. It will be seen, therefore, from this, that while the goods which have been boiled with rosin may appear all right when finished, they will often develop a color on keeping. This is more likely to occur when the hardness of the water is due to mag-

nesium, both on account of the more marked color of the magnesium soaps and also the comparative slowness with which magnesium hardness is decomposed by soaps. Rosin soaps *always* tend to develop color, and soaps containing rosin are particularly unsuitable for hard waters.

In the light of these foregoing remarks it is easy to see what happens when goods which have been boiled in ash and rosin are washed out of the kier in hard water. The soap, instead of being dissolved and washed out by the water, is decomposed and deposited as a lime or a magnesia soap in the goods which eventually turns yellow.

A splendid, permanent white can be secured, however, by boiling the goods for a short time in soda ash alone after the ash and rosin boil and without removing the goods from the kier.

For some classes of work rosin boiling possesses a very distinct advantage, as stated, it is almost essential after a lime boil. Again, it adds weight to the goods and again, a lime and rosin bleach is also very material in the production of certain effects in the finishing of certain fabrics in which a firm, hard, linen-like feel is required without using much starch, etc., in the dressing, such as many beetle finish goods. Some finishes, beetle finishes especially, have to be guaranteed as pure finishes, that is to say, no starch or other finishing materials must be added in the finishing operations, but the cloth is expected to have a *"firm"* feel. This can only be produced by the aid of the lime boil and rosin. A caustic soda boil instead of lime does not answer, it leaves the cloth soft and spongy, it will not hold the finish and the goods become sleazy in a short time.

A short boil with soda ash after the rosin and soda boil is for the purpose of completing the removal of the fatty matters and any undissolved rosin which might give rise to a brown discoloration. In any case, the rosin, or its results, cannot be entirely removed, and is necessary where certain finishes, as stated, are desired. W. B. (Maine.)

Increasing the Breaking Strength.

Editor Cotton:

The questions of "J. L. D. (R. I.)" in the September number bring up a problem that is doubtless very common to many others, and I would like at this time to attempt to assist him as much as possible by suggesting a few of the methods I have used in delivering myself from the evil of weak yarn.

This weak yarn proposition is, in 99 instances out of 100, due directly to weak cotton, but as we are so placed, or rather as our position in the line of industry is such that we are not called upon for suggestions or remarks in that particular, there is but one thing to do, to assist, by regulating the speeds, drafts and weights, settings and tensions, to retain all the strength the fiber ever had, and at the same time maintain the required amount of production.

There is no doubt but that "J. L. D." has opening process enough with the porcupine beater to get all lump cotton opened. If so the only other change I would suggest for the picking would be for him to try 1,200 r.p.m. on the beater, not forgetting to bring the feed back to the production required after the beater has been slowed down. By this change the number of blows per inch will be reduced. The mere fact that the cotton is of short fiber should determine that the grade might possibly be of weak nature, and if such be the case, it certainly won't help the breaking strength by beating it too much.

If "J. L. D." could by any means secure even yardage by eliminating one process of picking, the intermediate, I should suggest that this be done also, but he should be certain the yardage is even or else the benefit derived from less beating will be lost in uneven sizing.

If the evener belts are jumping from one place to another on the surface of the cones, there is really the cause of a great deal of weak yarn, for heavy and light sizing will throw breakage everywhere but in the right place.

The next place that adds to weak yarn is the card. The card draft should be at least 124 inches, and more if possible, but if it is impossible for him to change this condition, "J. L. D." is certainly out of luck, for he is not cleaning the web in the first place, and every bit of dirt he leaves in the web will cause the light spinning rolls to jump and make a weak place. Together with that there is an evening process that takes place when the draft is long that is very prevalent. This evening process is at the feed roll; the slow action of the roll against the regular speed of the licker-in gives a finer combing process than a short draft, as the long draft eliminates the bunches to a certain extent and thus causes evener yarn. This lengthened draft will give the opportunity of running a 50 grain card sliver in the place of the 60 grain, and allows the drawing rolls to draw their fibers evener, for there isn't the bulk under the top rolls with the 50 grain sliver that there is with the 60 grain.

For instance, let "J. L. D." make this test: Try a fine strand of yarn between the drawing rolls and note the grip the rolls have upon it. Then place a 3/8-inch rope under the same roll and notice the grip the rolls have upon it.

Don't be afraid to spread the drawing frame rolls, especially the 2nd and 3rd and the 3rd and 4th. Keep the 1st and 2nd as near the 1/8 of an inch over the staple as possible. Put a hole in the trumpets of the drawings that the sliver will slip through easily. Take all tension off the sliver between the front steel and the calender roll. This will remove the thick and thin places, making stronger yarn. Finish a 50 grain sliver from drawing, then make .50 hank slubbing the same as at present.

The rest of "J. L. D.'s" tie-up seems all right. He should get away from the old process of setting rolls, namely, setting the 1st and 2nd 1/16 inch more than the staple, and the 2nd and 3rd 3/16 inch more than staple, and the 3rd and 4th 5/16 inch over the staple. Those who follow this plan surely must see that if a heavy sliver is used, a hard and fast rule that is used when a light sliver is running simply won't handle the bulkier one. The only positive rule to follow in roll setting is to keep the two front rolls as near to the staple as possible, allowing but 1/8 of an inch over the staple in any case and then push the rest of the rolls apart until the sliver between the rolls gives under a little pressure, for it matters not what the distance is, open them.

The general attitude on roll settings is "Be careful not to open too far." But, "Where is too far?" is the question, and after getting the apparent solution of it, take the frame next to the one that is supposed to be set correctly and place the rolls in the position that has been described in these paragraphs, get the tension slackened and put a large

tapered hole in the trumpet. A small hole in the trumpet will put a core in the sliver; together with that the sliver will pull apart beneath the trumpet on account of the tension between the point of the trumpet and the calender roll. Keep the 1st and 2nd rolls to staple, then go the limit with the rest, push them back until the sliver gives away easy under pressure between the rolls. Then and only then will the rolls draw properly. If the tension can not be gotten easy between the rolls, the bulk is too heavy and it should be cut down and the rolls then set to the new tuft.

These suggestions may help "J. L. D." if he will follow them closely. If he is in doubt about any suggestion here, let him come again with a question to Cotton and we will try to help him. A. B. C. (R. I.)

A Mill Experience.

Editor Cotton:

At the recent sectional meeting of carders at Columbia, I notice a difference of opinion in regard to the relative merits of two and three process picking, and one and two process drawing. It is interesting and helpful to get the various and varied opinions of the men in regard to these two important operations, and it is by a freedom of interchange of ideas that we can get all opinions and then apply the best to our own conditions.

I am strongly in favor of three-process picking, and have found that with three processes I can get a much cleaner and more even lap. As to drawing, I feel that the second process is necessary for the reason that the second process can reduce much variation that will get by the first process, and also with two processes, the roving can be made evener and the fibers will be more parallel and take up more nearly the same amount of twist.

A few years ago I received a telegram asking me to go to a certain southern mill that was having difficulty with the yarn. They wanted me to see if I could do something to help them out of their trouble. I agreed to go.

It was Sunday when I reached the town, and the superintendent met me, taking me to his home where we sat down to talk the proposition over. I immediately suggested that we go to the mill and give the job the once-over. Much to my surprise, however, the "super" replied, "Before we even go to the mill, I want you to say that you will take the job of overseer of carding, regardless of what you may find." This, of course, seemed a little unusual, but after some insistence on his part, I said I would take it, so we went over to the mill. And what a sight we beheld!

In the first place, they were running an 18-ounce lap, and this for making 21½s warp yarn. Then on top of that, the man before me had cut out the intermediate pickers, using only two processes, and had also dispensed with one of the two processes of drawing. Further, they were using three sets of fly frames for making a .2 hank roving.

Needless to say, their breaking strength was away off, and their work was going very badly. I could see at once why that superintendent wanted me to take the job before I saw the conditions.

In starting to correct the conditions, the first thing I did was to put the intermediate pickers back to work, then I put the second process of drawing back also, and took out one line of the roving frames. I cut the weight of lap down to 12 ounces. My predecessor had the feed plate set at a 10 and I changed this to a 12.

Where the spinners had been running six sides with the old arrangement, and having a deuce of a time at that, when we got the three picking processes and the two drawing processes into operation, they were able to run fourteen sides each. Furthermore, the breaking strength of the yarn was increased 15 pounds up to Draper standard.

I'll admit that this was doubtless an exceptional case, but I do attribute the better running work and the increased breaking strength solely to the additional cleaning and drafting the cotton received with the additional picking and drawing.

However, there are of course other overseers of carding and superintendents who are in favor of the method of less picking and drawing, and as we profit by exchanging ideas and opinions on these things, I should be very much interested in any arguments or experiences which may be presented from the other side. I should like to see some of these in this department of Cotton.

Contributor No. 3.

The Effect of Twist in Knitting Yarns.

Editor Cotton:

In knitting a tube of plain fabric, such as a stocking leg, there is a tendency of the fabric to form a spiral, especially with the harder twisted yarns. Can you give me any information regarding this tendency? W. C. (Mass.)

Editor Cotton:

A recent investigation regarding the subject of "W. C.'s" inquiry gives us the following information:

A single yarn was spun with different amounts of twist (all to the right) from which several samples of knitted fabric were made. The angle which the wales made with the length of cloth was measured and recorded.

The single yarn was a number thirteen. It was twisted with thirteen and three-tenths, sixteen and six-tenths, nineteen and three-tenths, twenty and four-tenths, twenty-five, twenty-seven and seven-tenths and twenty-nine and eight-tenths turns per inch.

A sample fabric was then knitted, on a 120-needle automatic hosiery machine from yarn having each of these single twists. The harder twisted yarns showed a greater tendency to form a spiral than did the others.

This tabulation gives the twists per inch and the corresponding angle in the cloth.

Turns Per Inch.	Angle of Wales.
13.3	27°
16.6	32°
19.3	30°
20.4	33°
25.0	39°
27.7	41°
29.8	41°

Of course, a much greater range of twist must be used and more than seven points ascertained before any law can be laid down, but these seven points are plotted on the accompanying chart to show the tendency which these points indicate.

On the chart, Fig. 1, the horizontal figures represent twists per inch in the yarn and the vertical figures represent the angles, in degrees, which the wales make with the

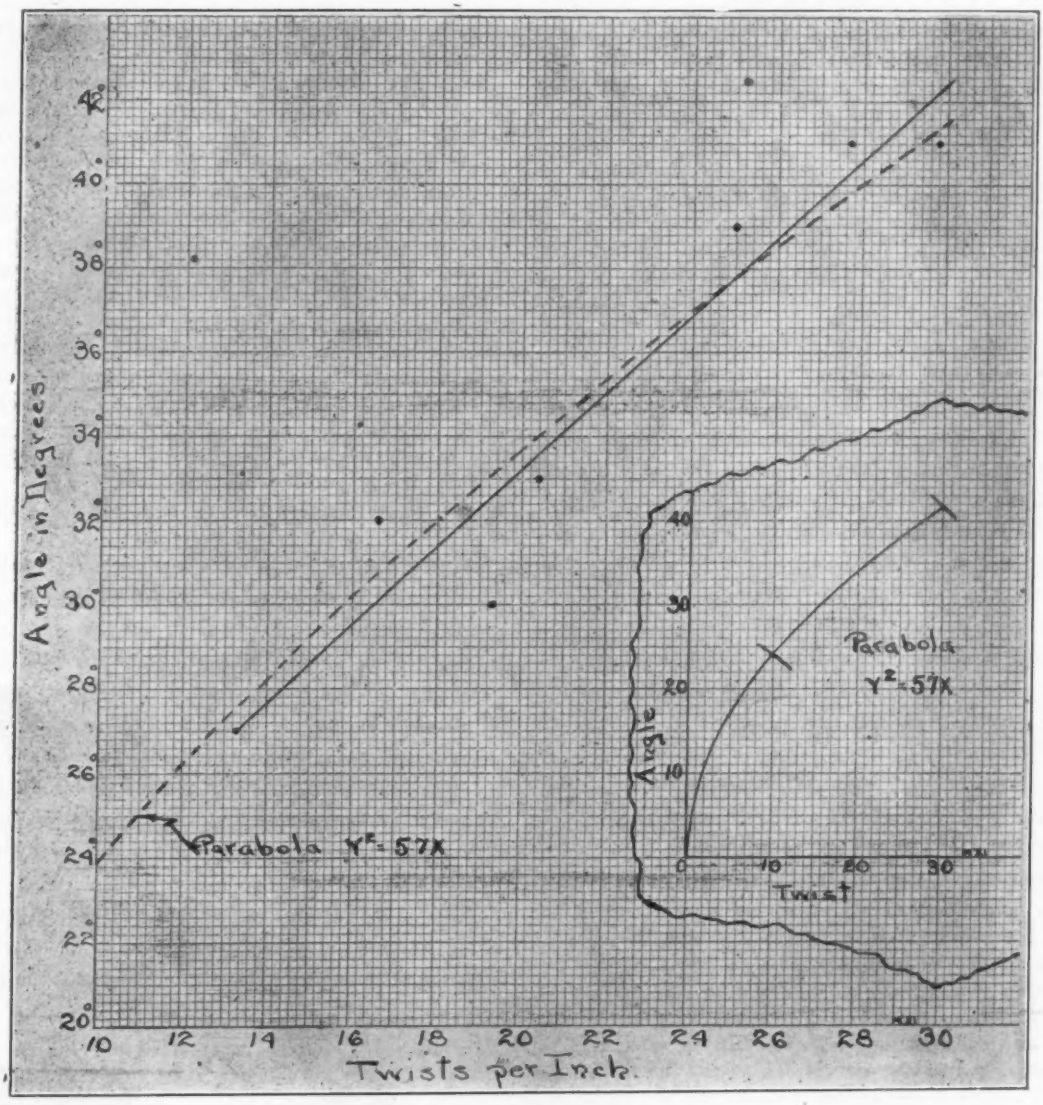


Fig. 1.

direction of the fabric. The solid line running at about 45 degrees with the horizontal seems to be the line best fitted to average the seven points. This line continued would lead to the belief that yarn with no twist, when made into cloth, would have an angle between 14 and 15 degrees. This angle might be accounted for by the spiral form in which the yarn is placed when in the cloth. However, if we should neglect this cause of forming a spiral and search for some other explanations, the following offers itself for consideration:

The dotted line is a portion of a parabola which starts at the point of no twist and no spiral angle. The form of the parabola is shown in the insert at the lower right hand corner of the chart, and the section shown large is included between the two crossing lines on the insert. This curve comes very near to coincidence with the straight line just discussed and although it is but experimental, seems to come in a reasonable position with respect to the seven points.

The equation of this parabolic curve is

$$Y^2 = 57\ X$$

when Y is the angle in degrees and X is the twists per inch of the single yarn. This means that fifty-seven times the twists per inch represent the square of the angle in degrees.

G. R. M. (Mass.)

Asks for Information on Dyeing.

Editor Cotton:

I have in hand a letter from the treasurer of a large Canadian concern which says, "We have read many of your articles on mill management, etc., and have considered them very interesting, and most of the ideas we have been familiar with or in sympathy with and have understood them. With some details that we have not agreed with you, possibly have not understood them. Would it be asking too much of you to give us a letter explaining the advantages in dyeing the finished stock in the form of a cone and warp?"

I want to take this opportunity to state once more that I will answer such inquiries through the columns of Cotton only, and in no other way.

In regard to this gentleman's inquiry, I would like to

say first that I have never had any experience in dyeing, and that I never saw the method employed of dyeing the finished stock in the form of cone or warp. I would like to have other readers of this department answer this inquiry. Wash (Conn.)

Thoughts on the Help Problem.

Editor Cotton:

Reading the letter by "Superintendent (Ga.)" in the July issue on "How I Would Operate a Cotton Mill" brings to mind the many angles of the management of help problem that cotton mills have to contend with, and it's a hard problem to solve out successfully. Long experience has taught me that the best method, so far, is to pay them all you can and use no bonus system. The bonus system is good, as the Georgia superintendent states, but it is one endless chain of trouble. The help will at times become discouraged and say, "Why, have we got to work a whole year to get the rest of our pay? If we have earned it, and you are going to give it to us at the end of the year, why not give it to us at our regular pay day?" I have been connected with the bonus situation and was mighty glad when it was abolished and the money added to the regular day's wages.

As to what they do with their money, it's like trying to make a pecan be a hickory-nut, it's a nut but not quite a hickory-nut. So you can get some of them to save and some you cannot, and they are better satisfied when you let them alone to do as they please with their earnings. Of course I believe in advising them, and in encouraging them to save and lay up something for a rainy day, but usually when they have a few hundred saved up, and are getting along nicely, an automobile is the one thing they study about, and, of course, some dealer is always watching them and taking the family out for a ride, and ma says to pa and the children say to pa, "What's the use of having money unless we can enjoy it? Let's get the car. I'll help pay for it." So there you go, and the family that's going to save is already at it, and the one that isn't thinks you are trying to work some trick on them and are superstitious about the matter. Therefore, we have to handle them as they are to get the best results in the long run.

About keeping the village clean, if "Superintendent" is a superintendent, why doesn't he say "How I Am Operating My Mill," and "How I Am Keeping It Cleaned Up?" I used to think of a lot of things I would do if I ever got to be a superintendent, but when that time came I could see a lot of things that would be in the way of carrying out some plans that I had pictured in my mind. Equipping the tenant's houses with lights and water means laying out a bunch of money. Then you have to get the consent of all those owning land on the branch or creek along the line of which you intend to empty your sewage, build filters, etc., and then probably have to stand a law suit with some country farmer.

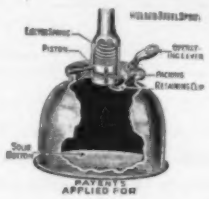
I have water and lights in my village and am proud of it, but it was not until we went through just what I have mentioned. But we bought the best filters made and of course we won out. It's a very fine thing to have this water and sewage system; it is more healthful for the employees and makes a village more attractive.

The way we manage our cleaning up proposition is this, we encourage the operatives to get the premises cleaned, the front yards and around the houses, and we furnish them with garbage cans in which to put their rubbish. Then at certain times the garbage man goes around and collects this trash and empties at a certain place. If, perchance, some have not cleaned up around their houses we let some of the yard hands go around and finish up what has not been done. We don't have to do this but a few times before they will do it themselves. We have what we call clean-up weeks occasionally during the Spring and Summer months, and they are always notified and we generally get very good results. So, after all, it's not what you do, but it's the way you do certain things as to what results you may expect to get. T. A. D. (Ga.)

A Positive Force Feed Oiler.

An oiler with a positive force feed has recently been put on the market by Gustave Lidseen, 830-840 South Central Avenue, Chicago, Ill. In bringing out this new oiler it has been the aim of Mr. Lidseen to produce a type of oiler that would give the operative a few drops of oil at a time or just sufficient for the size of the bearing which was to be lubricated, and also arranged so as to keep the spout free from obstruction through possible contact with dirt or gummed grease around an oil hole. After several months of experimental work, this oiler has now been produced and is being presented to the trade.

Some of the features of this oiler are the positive force action, which emits a very small quantity of oil at each operation of the lever, giving the operator absolute control



of the lubricant; welded spouts, no solder being used on the entire can; a wide opening for filling which allows the operator to judge how much he has in the can and not let it overflow and waste in filling; curved flanges and lock members that connect the spout to the can proper with a half turn, which makes a quick and oil-tight joint; and so arranged that should the can tip over there could be no leakage of oil from the end of the spout.

A mill man to whom this oiler was submitted became enthusiastic over its possibilities for oiling roll necks on the frames in the carding and spinning departments, as it would furnish the right amount of oil for the roll neck and at the same time prevent the present undue waste of oil which runs down on the frame and the floor, causing unnecessary dirt and frequently making stains on the finished product. Undoubtedly this new oiler will make a name for itself in the textile field as an oil saver and a trouble preventer.

KNITTING SECTION

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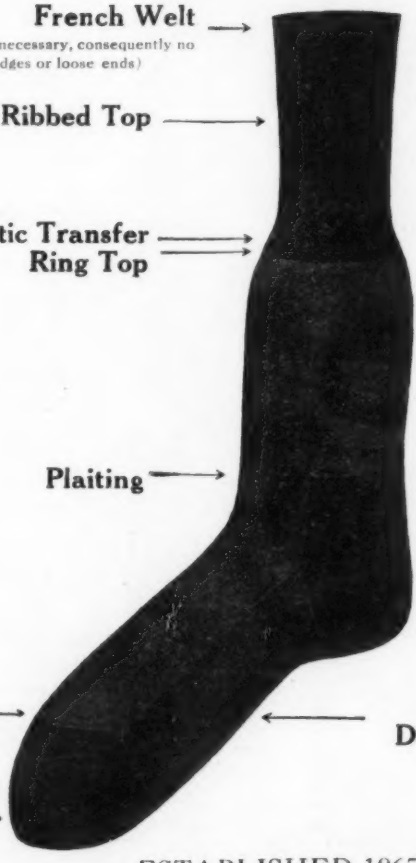

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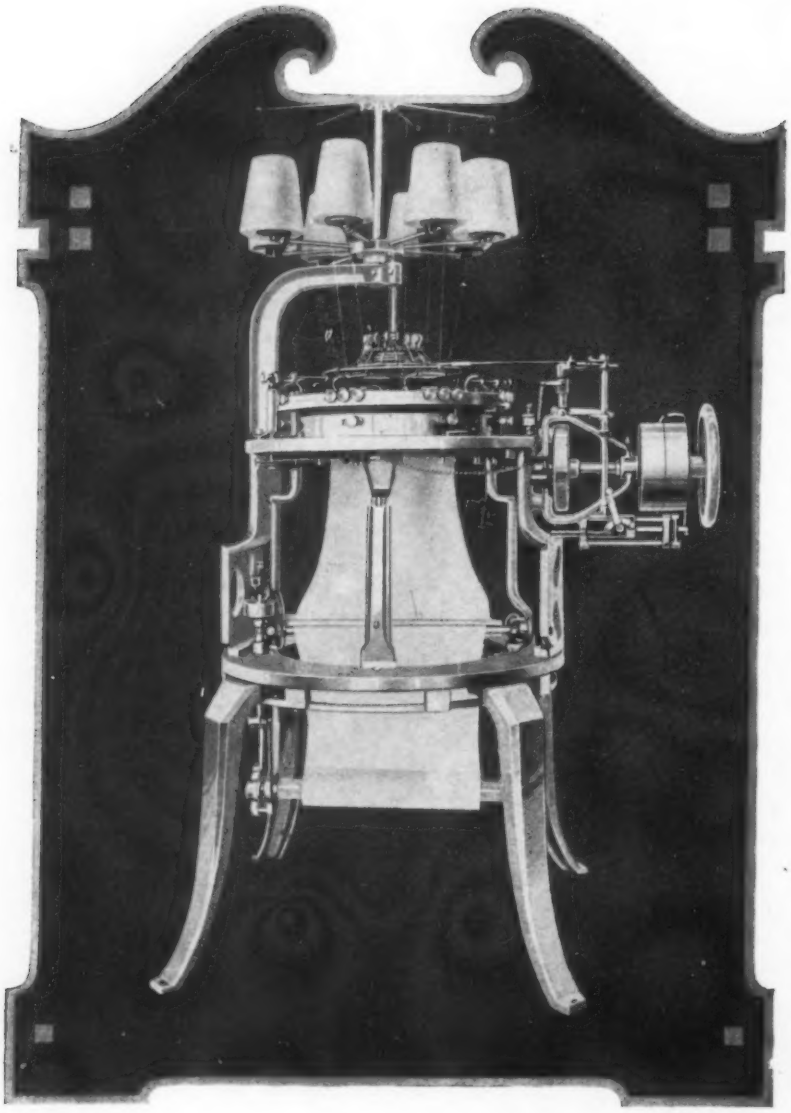

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Sewing and Seaming in a Knitting Mill

BY WILLIAM DAVIS, M. A.

Particularly in the cut-up branch of the knitting industry, the stitching and seaming of the garments is of vital importance for it is known that the wider development of the cut trade in underwear was retarded greatly until more efficient methods of seaming the goods were invented. The well-known Flatlock machine, the fruit of 30 years unremitting toil on the part of the inventors, may be justly said to have revolutionized this branch of the trade and to have vastly increased its status on the markets. Similarly in other branches of the industry manufacturers are ever on the outlook for methods of joining the edges and performing the various stitching operations with greater speed which will at the same time maintain standards of production.

We can safely assert that this branch of technical study has been very considerably neglected in the past, the sewing machine being too often regarded as a kind of domestic toy unworthy of the study of serious minded people. Present experiences of competition and of tightening up of conditions all around should convince us that no subject should be underestimated in the whole course of manufacturing. Students should scrutinize the structure and the function of the various sewing stitches just as keenly as the knitted fabric structure and a little attention will show that the subject is fraught with very considerable interest.

What appears on the surface to be a confusing array of minute mechanism will prove to have general principles which can be mastered in their fundamentals by the individual of ordinary intelligence. That he will become an expert in the mechanism is quite a different matter for it is recognized that this expertness, which calls for special neatness and deftness of touch, can only be acquired as a result of long apprenticeship and practical experience.

All are aware of the loss of time and production incurred in the sewing machine department owing to small defects in machine adjustment. In many cases the manufacturer is at a loss to know exactly how to manipulate this department in regard to supervision and staff, if his plant of sewing and stitching machines does not warrant the employment of a full-time expert mechanic for there is little else he can find him to do because the cutting-out, which is generally performed in this department also, is generally more suited to a woman.

If the firm cannot employ a full-time mechanic, the repairs and adjustments have generally to be regulated from the outside and a visiting workman proves so fancy in his charges as to partake almost of a professional. In many cases the defect is of so trifling a character that it is quickly put right and full time is charged including the time for coming and going. Many districts have overcome this to a certain extent by giving special instructions to their girl workers in making small adjustments on the machine and these have been found to improve matters considerably for they are shown the various points to be examined and are taught how to effect repairs of small irregularities. The drawback to this system is that the worker begins to be too curious regarding the internal mechanism of the machine and too confident of her powers with a screwdriver so that in the operation of dismantling vital parts are upset and put out of order. For this reason, many hold that a "little knowledge is a dangerous thing" and prohibit the worker touching the machine at all whenever it ceases to function properly and certainly if there is a mechanic available, this is the proper course to pursue.

But it is doubtful if the sewing machine is of so small account to the manufacturer as he affects because the modern overlock and flatlock and other types of machines have possibilities which extend much farther than the mere joining edges of looped fabric together or attaching braces and bands. Take the ornamental stitches employed for edging by the overlock, or the clocking and embroidery performed on hosiery by the flatlock and overlock machines, also consider the latest development in high-class embroidery on the sewing machine and it will be clear that it is an instrument destined to become more and more useful as an adjunct in actual manufacturing and essential to the ornamenting and finishing of the product.

Buyers of underwear are getting tired of the monotonous kind of garment offered to them and are ready to appreciate and encourage attempts at embellishing the garment by skillful additions of lace, or crochet or fancy stitching round the borders or edges, and developed in these directions there is a wide field for the skillful garment trimmer who understands the ways of imparting those finer touches of elegance to the garment.

On going through knitting factories one is often struck by the haphazard and unsystematic arrangement of sewing and seaming machine benches. This is due in many cases to shortage of space and a bench which should be continuous has to be located in various parts of a room. Then the arrangement of the machines on the benches is often out of the true sequence of operations. This arrangement should be based on the very elementary law that when the garment is finished with an operation on any machine, the machine required for the next operation in the routine should be immediately adjoining it so that the material is slipped along from one worker to another.

This is the theory but it does not always work out in practice, for the garments have to be collected at various points and distributed further on to the workers. These distributing points are often located at the extreme end of a workroom and the same garments are repeatedly carried back and forth during the operation of trimming which is distinctly wasteful of time and labor as well as exposing the garments to greater chances of being soiled in the transition stages. These collecting points when necessary should be located near the place where the next stage has to be conducted, so as to save time and ensure a steady flow of the work through the factory in one direction.

Regarding the method of driving sewing machine benches, there is little to equal the electric drive, a motor being located at one end of the bench underneath and the whole series driven from one motor. In some cases these motors are placed above the bench, but the motor placed underneath out of view of the operators is better in general practice. Individual machines are driven by their own belts from the main shaft, and there is considerable diversity of practice in regard to the kind of drive which

shall be employed. The open drive underneath the machine is fraught with a certain amount of danger to the worker, in that she often bends down to pick up something from the floor and her hair or clothing may become entangled in the running shafting. The writer is much in favor of the new type of enclosed benching which is being used in up-to-date concerns in increasing quantities. By this system the running wheels are located quite near the table underneath and all the parts are completely enclosed. It is neat in appearance and reduces the chances of accident to the worker, but particularly this enclosed type is not so liable to have loose oil clinging to it which can fall onto the goods and stain them.

Much damage is done to the goods by the presence of oil in and about the machines and in general it may be asserted that the great majority of machines receive too much oil. Only a very small amount is essential to produce a working film between the friction surfaces and anything more than this is left hanging round ready to drop on to the goods or floor with the least vibration. Usually each operator is supplied with an oiler and she religiously goes round the parts and swills it plentifully at frequent intervals and these oil drops are always getting on the goods. So serious has this become in many cases that the managements have found it beneficial to entrust all oiling in the flat to one individual who examines the shafts and oils the parts at regular intervals, only giving the required minimum amount of oil.

This trouble of oil stains getting on to the goods on the sewing machines is greatly accentuated if certain kinds of oil are employed. Unfortunately it is generally found that oils which are ideal for lubricating the machine parts get quickly fixed on the goods and firmly resist all attempts at their removal by the application of soap. Pure mineral oils should be used for lubricating sewing machine parts and this is precisely the kind of oil which clings so tenaciously to the fiber of the garment and sets up a permanent attachment thereto. Many kinds of oils are advertised as stainless, by which is meant that they will not stain the goods permanently or that the goods will easily be scoured free of the oil by the ordinary routine of treatment but many of these are of little use as lubricants. In animal oils acids are present which prove deleterious to the fiber of the textile, the shaft is run on globules of fat.

Suggested Arrangement of Machines.

The suggested order of arrangement of sewing and seaming machines in a factory varies with the kind of trade done by the firm and herewith is given a suggested order of machines as they would follow on a sewing machine bench in a factory doing the cut-up or circular trade. After the garment pieces are excised from the web, the first operation is to complete these parts by attaching ribs to the bottoms of the legs of pants, to the bottoms of shirts and at the extremities of sleeves. This machine can be run at about 2,500 revolutions per minute. The overlock machine would then be placed in order and the edges of the garment seamed together. If this seam proves too high or bulky, it may be passed to a second machine known as the seam-covering or felling machine which turns the seam over and lays the edge once more against the fabric, running over it with a simple chain stitch, which operation can be performed at a very great speed.

If the seaming of cut goods is done on the flatlock, then the ribs can be attached and the joining of the edges performed on the same machine. The flatlock takes up a much greater length of thread as we shall see later, but there can be no doubt regarding the uniformity and general excellence of the seam. If the ordinary overlock machine is employed, the seam tends to stand up and project some distance above the general level of the fabric which for underwear is specially uncomfortable and regarded as a serious drawback to these kinds of garments. The speed of the machine for making the flatlock seam is 3,000 stitches per minute.

After the rib portions are attached and the edges of the garments seamed together, the garment is now ready for adding any of the various bands or ornamental features of the garment. The pant, for example, has to have its bands attached at the top and several rows of stitching added to give the article a more finished appearance. For this work the ordinary chain stitch is employed with its single thread as it can be worked at enormous speed and is quite suitable for attaching pieces of woven fabric above the knitted cloth, as is done for bands in trousers. The drawback to the use of the chain stitch is, of course, its well known tendency to unravel once a loose end has been secured when it will open out completely from start to finish as long as a definite pull is exerted on the thread. Having regard to this disadvantage many manufacturers prefer to make assurance doubly sure and put on their bands by the lock-stitch machine where two threads are employed and the stitch produced being the firmest possible it will not come undone under any consideration. It has also an advantage of being producible with a minimum of sewing cotton as it takes less to produce a foot of stitched fabric than any other variety of sewing machine stitch. The speed of the lockstitch is about 3,500 stitches per minute; it should be clearly kept in mind that the lockstitch is the most inelastic stitch of any and is absolutely out of the question for any part of a garment where elasticity is essential. This is not the case where a piece of woven fabric is being attached such as a waistband or a brace strap where elasticity is not essential and indeed undesirable.

In this class of lockstitch machine may be included the type employed for attaching fronts to the shirts on which the buttons and button holes are later fixed. Great advances have been made in this type of machine in that twin needles are now employed, so that each side of this front can be stitched and attached to the garment at one and the same time. Also the front can be doubled over as it passes into the machine, an operation which not so long ago had to be performed entirely by hand.

The double or twin needle machine is also employed for attaching lace where a single row of stitching would be inadequate to give a firm grip. Two needles at short distances apart are employed and the lace is rapidly attached at one operation. It is also found useful in those grades of ladies' undergarments which require to have special pockets or gores inserted at the busts and where the fabric is attached by means of a double row of stitching in the twin needle sewing machine using the lockstitch. These machines are run at about 3,000 stitches per minute. After these machines will be placed the buttonhole machine and the button sewing machine. In these varieties the foundation stitch is the lockstitch along with the principle of the

jumping needle for the button hole machine and the traveling part for the button hole.

It is not quite certain that the machine inventor has achieved his final success with the machine for making button holes, for a great number of the button holes made in the average factory are hard and unyielding and require considerable effort to get the button through. This is a point often pounced upon by fastidious wearers who object to their unsatisfactory character and stipulate that the button holes on their garments shall be made entirely by skilled hand workers and many large firms retain a number of their older workers, who achieved skill in this branch of work in the early days of training and who are employed to give effect to customers wishes in this respect.

Another cause of unsatisfactory button holes may be that in too many cases this machine is one of the first which an operator has to learn in entering the factory as it is so entirely automatic that skill is soon acquired, or appears to be acquired. The quality of the button hole in regard to elasticity may be altered by the tensioning of the sewing cotton and young workers do not understand the importance of this point. In regard to cotton used in the machines, it is a matter which is often overlooked and some attention should be given to the various qualities of cotton. This is intimately bound up with the output of the machines, for if the cotton is so weak that it will not withstand the jerks of the tension finger, or breaks when the ordinary sewing strains are put upon it, the productive capacity of the machine will be seriously impaired, as the worker will spend too great a proportion of her time in mending up the broken thread and re-threading the machine.

Another defect is found in the sewing cotton which often has too fibrous a surface on the thread so the loose material is rubbed off as the yarn passes through the various tensions and particularly through the eye of the needle. The latter is very fine in aperture, and soon becomes clogged with loose fiber or lint from the yarn.

In regard to the expense of sewing materials, it is, we believe, a false economy to buy cottons which are cheaper in price but of insufficient tensile strength, for the difference in price is often more than counterbalanced by the reduced output from the machine and the faulty appearance of the seamed goods. If economies in seaming and sewing threads are called for, the overseer or manufacturer should rather turn his attention to those threads which do not penetrate the fabric by passing through the eye of a needle, but which are placed round the edge of the seam by means of a looper. These yarns do not have the same strain put upon them in working, they do not require to be of the same character as the needle threads, and cheaper qualities of yarns can often be employed and be quite suitable for the purpose.

When considering the working qualities of cotton in sewing machines, the speed of the machine should be carefully gone into, for a cotton which will not work at a speed of 3,000 stitches per minute might work quite satisfactorily at 2,500 stitches per minute. It is sometimes true economy to reduce the speed of the machine somewhat to ensure a more harmonious working of the materials.

The ability you have will never provide any limousines; it's the ability you use that brings in the coin.

Meetings of Southern Knitters.

Forty-one representative hosiery manufacturers from the Carolinas, Tennessee and adjacent states attended a conference in Charlotte, N. C., on September 20, called by the presidents of the southwestern and southeastern divisions of the National Association of Hosiery and Underwear Manufacturers, for a canvass of the admittedly perplexing market situation brought about by the sharp advance in cotton and still sharper increase in yarn prices.

The meeting partook of the nature of a quiz as to present and previous manufacturing costs and mill prices, during which confidential relations were maintained. Manufacturers exchanged prices on practically every line of cotton hosiery, giving especial attention to those lines in the manufacture of which the South leads, and costs were submitted direct from mills' cost sheets.

Large cotton and spinning interests were represented, and from these it was gathered that hosiery prices named recently are on a basis lower than that of the actual cost of yarn, especially of the finer counts. It was the apparent sentiment of the meeting that, while yarns had advanced more radically than cotton, the spinners had not been extravagant in their views, the trend of which was that higher prices will be heard.

The question was raised whether the country's purchasing power would absorb the capacity production of mills; whether unavoidably higher prices might not act as a check on consumption. The answer, in part, was that dealers' stocks are low; that there can be no escape from buying for consumer needs, although, it was expected, jobbers might again restrict purchases to 30 days. There seemed to be the same hesitancy about raising prices upward as there was about marking them down when last year the market began to slump.

Nearly every manufacturer, it developed during the quiz, has advanced his prices over the late August level, but few had gone up sufficient to cover the higher yarn cost. "But they will have to go still higher or we either will have to take more losses or quit making hosiery," was the sentiment expressed by several mill heads.

The presiding officer was F. L. Miller, Jr., United Hosiery Mills Corporation, Chattanooga, Tenn.

Another recent meeting of southern knitters was that held by the southwestern division of the National Association of Hosiery and Underwear Manufacturers at Signal Mountain, near Chattanooga, Tenn., on Friday, September 9th. This meeting was attended by about thirty members, and F. L. Miller, Jr., president of the Southwestern Division of the Association, acted as chairman.

The concensus of opinion as expressed at this meeting was that the knit goods manufacturers are not getting enough for their products to cover the increased cost of production by the recent advances in raw cotton, and the prediction was made of a substantial increase in prices.

Most of the manufacturers present expressed the view that an advance of from 15 to 20 per cent will be necessary to cover the advances in the cotton market. They were of the opinion that cotton will eventually go up to 25 cents a pound, while others expressed the belief that it will hover around 20 cents for quite a period.

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The Knit Goods Market

Whatever has been or may be ultimately the effect of the September cotton price movement on the cotton goods market, it put activity in business in spots where there was stagnation. This was the opinion of a banker even after there had been violent recessions from prices established during the spurt. "Business has been a little better since cotton began to sell at more nearly what it is worth," he said.

Another effect, especially noticeable in the knit goods market, was a jolt for distributing interests which had been operating as though it were their aim to still further depress prices which then were dangerously near—in many instances below—replacement cost.

There were important jobbers who admitted cotton was relatively lower than at the prewar normal value, and yet they hesitated to buy goods for more than 30 to 60 days. Undoubtedly the attitude of wholesalers toward the market had its psychological influence among retailers buying from jobbers. That this seems more than a probability is indicated by the fact, more especially in hosiery, that mills selling direct to the retail trade were booking orders ahead of their capacity to produce and were buying from mills which ordinarily were kept employed meeting their commitments to jobbers. "Our best customers are the direct-to-retailer mills," the executive of a large hitherto exclusively jobber mill said.

It seems inconceivable that distributors, while cotton was down to poverty prices and finished product was available at less than actual value, neglected the opportunity. Deferred buying, for no really good reason, so far as has been disclosed, was responsible for restricted production at a time when raw materials were at bottom prices and idle operatives were clamoring for employment in more than a dozen knitting centers. Mills were receiving no encouragement and wisely limited output to the measure of their customers' purchases. A few had stocks of finished goods, probably not more than 10 to 15 per cent of their holding of January and February. For them the jump in cotton was opportune. The result was almost magical.

Every dozen of stock goods in mill warehouses on September 2nd could have been sold by the 15th on rush orders by wire and mail. For the time it would have been easily possible to dispense with salesmen. It seemed as though every jobber was short of merchandise and eager to cover, but usually at earlier values. They wanted goods in September, for the remainder of the year, at August prices. Some got them on that basis; many did not. When higher prices—still too low in contrast with unfinished cotton—were named there was a repetition of that show of waiting with which every mill had become familiar. But there was less of the defiant attitude of some weeks before, when a buyer would say, "Well, there is the order; you can take it or leave it at price I said I would be willing to pay." While enriching the South, cotton was performing a national service in routing the bears.

For the first week of the ascent of cotton many buyers were inclined—or expressed themselves that way—to regard the movement as a flurry which would soon disappear if they gave it no attention. Then they gave evidence of anxiety and dropped in to intimate they might consider taking a few cases. Instantly advances were resented. Buyers said they could see no reason for them, admitting, however, it might be possible goods for spring would cost more. About that time mills began announcing withdrawal of their lines from the market. The first startling firm announcement of this character came from a number of North Carolina mills after a group of manufacturers had canvassed the situation. By the middle of the month the mills out of the market probably exceeded those which continued to quote down to near old prices. But the latter were representative of only certain lines, so that market was without merchandise, although it could be said to be in sight. As the month waned mill stocks were absorbed and manufacturers who had not already revised their prices proceeded to do so. In several instances road salesmen had been called from active duty pending revision.

Mill agents were in a stew. They could not quote a price, with promise of delivery, except with the understanding orders must await mill confirmation. Matters had come to a stage where a manufacturer not covered for his yarn requirements could not, with safety, name a price until he had done so, and it not infrequently happened that by the time a buyer received a mill's figures and put in his order yarn had taken another jump, and negotiations had to be gone over again. Operating by mail at long distance was impracticable, and usually the telegraph was too slow. Many deals were closed by long-distance telephone. And all the while goods were going to higher values, with prices generally about midway between actual value and buyers' offers.

Absolute retirement from the market was the logical thing for manufacturers. They reasoned that if prices were too high for their customers it were useless to try to accommodate them so long as advances continued, and as buyers warned that values could not remain where they then were, manufacturers concluded to wait for such declines as might make buying and selling approximately safe for both parties. They had not forgotten the flood of cancellations and rejections of merchandise twice in the last two years when the market sagged. If there was to come a reaction they were determined to be caught with no high-price yarn and again placed at the mercy of buyers. If cotton and yarns went higher, they knew that eventually the buyer would pay the advances. Southern mills led the procession for safeguarding mutual interests, and their eagerness to bring order out of chaos was stamped on the call for the general meeting in Charlotte on September 20.

The jump in cotton brought to the front what had come to be regarded a fact, that jobbers and retailers were short of stocks. Another development was a sudden change of attitude toward what in many instances had been condemned as hosiery seconds. Hundreds of cases shipped out in June and in early August remained in freight warehouses, dealers refusing to accept them on the ground delivery was late. Other hundreds of cases were in jobber warehouses awaiting return shipping instructions from manufacturers, dealers asserting the stockings ran strong in seconds. By the middle of September manufacturers were receiving remittances from these objectors. Seconds had become acceptable firsts in a jiffy.

Then there were the "hung-up" orders, which for weeks

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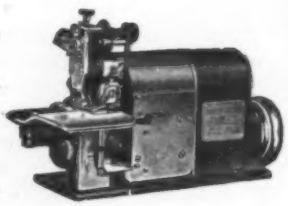

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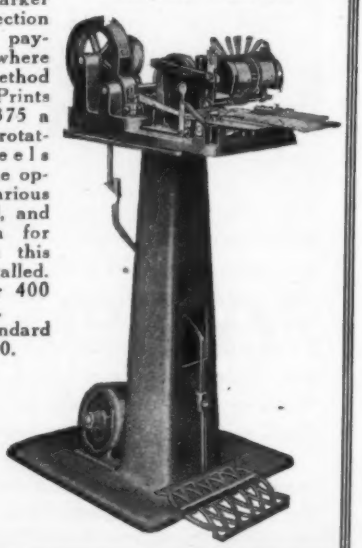

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were in mills without buyers' details and could not be shipped out. The buyers were waiting for a turn, intending to insist on a rebate in the event of a decline, and call for the merchandise should the market advance. It advanced, and suddenly they found need for goods which a few weeks before they were not certain might be wanted. In this class was a very large order for cheap cotton hosiery which had been placed in June at a special quantity price. The goods were bought for July shipment, but less than half the quantity contracted for had been called for. In the second week of September the jobbers called for the remainder of the hosiery. In the meantime the manufacturer had come to regard the order cancelled, and then ensued the usual haggling, the outcome of which was a compromise price considerably above that named in the order, yet still below the market value, basis of cotton.

This distributing trade was disturbed over the possible effect of price advances. An important jobber, who stated he represented the sentiment among his competitors generally, said in the third week of September that his establishment then was adhering to prices formerly prevailing, and would make no upward revisions until compelled by circumstances to do so. The wholesale trade believed, he said, that so soon as jobbers move their prices up mills will announce more radical advances than had been intimated. Fear was expressed also that advances by jobbers would be immediately followed by similar action by retailers, with the result, it was feared, the consuming public again would go on strike. There were jobbers who, however, when closely questioned, admitted they had revised prices. These are assumed to have been caught quite short of merchandise.

Many trade interests are of the opinion there will be no consumer strike against prices of cotton goods, for one reason, the public had been buying as sparingly as the merchants, not only in the practice of rigid economy, but in the hope of further declines, and therefore must buy for needs that cannot be ignored. Winter essentials, particularly in underwear and heavy hosiery, will be wanted, to the exclusion perhaps of some of the luxuries, in indulgence in which, according to federal tax reports, there has been reckless extravagance. In any event, higher prices for cotton goods need not necessarily be followed by any increase in the cost of other commodities, in some of which there is room for downward revision without the financial status of retail dealers. Unlike leather goods, cotton goods went down relatively with the raw material. At this writing it is the commonly expressed opinion among large distributors that cotton will settle somewhere between 15 and 18 cents, nearer the latter figure than the former. This view contemplates an admission that prices must stiffen by, say, 15 to 20 per cent.

Misses coarse gauge ribbed hosiery, weighing 28 ounces on size 7, was among the first of the hosiery lines to come out at new prices, being moved up 10 per cent to 95 cents a dozen, and a few days later to $1, making the aggregate advance approximately 15 per cent. At that time cotton had advanced fully 33 per cent and yarns, basis of 10s single carded, had gone up 65 per cent. Another product largely of southern mills, 176 needle hosiery for men and women, was moved up to one dollar. Previous prices ranged from 82½ to 90 cents. Several mills did not stop at a dollar jump, going to $1.02½ and $1.05. Among the new prices put out by one large mill were $1.07½ for women's 22 ounce carded ribs and 160 needle half hose, and one dollar for misses 24 ounce ribs, these prices being subject to trade discount of 3½ per cent.

The first jump in combed yarn half hose was 7½ cents a dozen on one line and 12½ on another. A coarse gauge mercerized sock which had been going to jobbers at $1.85 was promptly moved up to $2.10, and thus disappeared from the retail 25-cent class.

As mercerized yarns had taken a violent jump it became a question whether demand for the finished stockings at the necessarily higher values could be maintained. Several mill lines continued to be offered at former prices until the middle of September, when, with those of other mills, they were taken off the market. Mercerized yarn, basis of 60s 2-ply combed peeler, had gone up fully 65 cents a pound since hosiery prices for fall had been named early in August and earlier. "Mercerized goods are giving us no little anxiety," the executive of a large selling establishment said. "If the old-time demand comes back it is obvious there will have to be sharp upward revision. Unfortunately," he added, "high priced cotton and yarn does not necessarily mean increased demand for cotton hosiery, and unless demand increases considerably we will be little better off next spring than at present."

Half hose weighing two pounds and up a dozen, referred to usually as 84 needle socks, is hard hit by the cotton boost, and it would appear they will have to be removed from the 15 cent retail division. One mill now is quoting one dollar a dozen for sewed-top socks weighing two pounds per dozen, rise 10 cents and fall five, on quarter pounds. Trasfer tops are priced five cents higher. The 18-ounce sock of another mill is quoted at 87½ cents and its 20 ounce 90 cents, five cents rise on quarter pounds to 36 ounce, which weight is priced $1.20. At these prices there is a freight allowance of $1.20 per 100 pounds by both mills.

Branded mercerized lines selling through jobbers were withdrawn from the market early in the big session of the cotton movement, after having been sold rather heavily at prices based on cotton at 12 to 14 cents.

Several important jobbers who resented higher prices for immediate and nearby delivery, but admitted there might be justification for advances on goods for spring, were detected trying to cover for the early months of next year at and near old prices. They were placing large orders mainly for shipment in December. Obviously, December shipments were intended to cover requirements for next spring's distribution. Two mills promptly laid down new terms, notifying customers that orders for large December shipments would not be accepted unless they included specifications for reasonable quantities for October and November. The manufacturers were unwilling to carry spring goods until December for merchants who offered nothing reciprocal in the way of purchases for earlier months.

At least one hosiery mill is guaranteeing prices against declines until January 1st, but is asking for no assurance from buyers that they will pay advances in the event cotton cost goes higher. In this case the mill executive says the guarantee is absolutely safe, that there is no possibility of prices declining this year. Jobbers evidently are less confident, for they do not hesitate to ask for price protection. The guarantee usually is confined to goods sold under mill brands.

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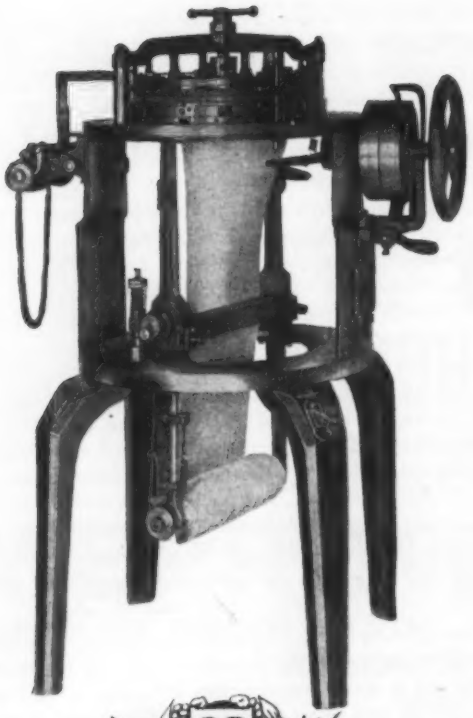

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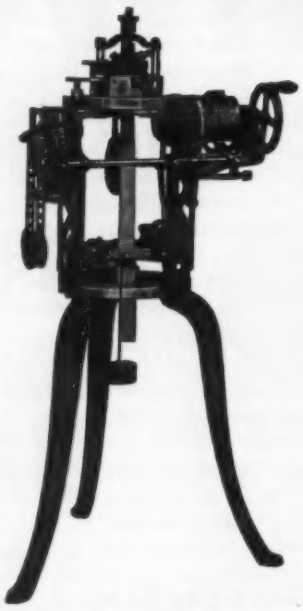

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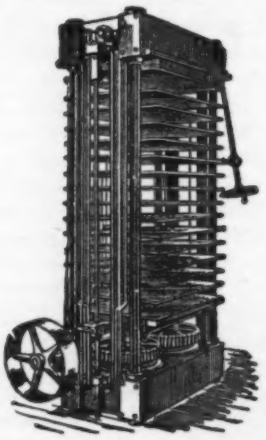

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spot light projected upon full fashioned, and except as to one or two lines of the latter, have undergone no price change for spring. A leading mill which opened recently named $15.50 for women's standard silk boot, mercerized top, heel and sole. This was an increase of one dollar from the price for the current season. Other silk numbers at this mill remain about where they were—half hose at $7.25 for full fashioned and seamless at $5.35.

Buying during the early days of the opening was in such volume that the mill declined the accounts of a number of former customers not in the ultra-desirable list, and scaled the orders of some of the heavier buyers. A leading distributor is understood to have contracted for 300 cases. Another mill opened on October 1st and it is stated there were indications a number of orders would have to be scaled pro rata for giving the lines the widest possible distribution.

Interest in silk hosiery is accentuated in the jobbing trade by the fact the strike in 16 mills—14 of these being in Philadelphia—probably will not be terminated before the end of the year. Representatives of the 14 Philadelphia manufacturers involved in the strike have had a number of conferences with an equal number of representatives of their respective employees, the presiding officer at the meetings being Conciliation Commissioner Moffett of the U. S. Department of Labor. The nearest approach to a settlement was an agreement that the men return to work at the wages and under the conditions existing at the time the strike was called, the questions at issue to be arbitrated immediately work was resumed. But there were two points on which the manufacturers stood out against the demands of the union knitters. These were: (1) That before the men resume work the manufacturers dismiss from employment those knitters who had entered the factories since the strike became effective, and (2) that no person over the age of 18 be taken on as a learner.

Both demands, were manufacturers to accede to them, would keep war veterans out of the mills. Men who fought in the world war and since have become knitters, taking the places of strikers and disloyal former employees, would have to go, to be superseded by men who were drawing $70 to $80 a week while the present learners—some of them—were in the trenches at $30 a month. A number of battle-scarred veterans of the war have become learners and others desire to serve an apprenticeship. Under the age limit which the union would impose they would be barred. This attitude on the part of the strikers, it is thought, will prove a strong factor in the loss of the long and costly strike.

Some of the Philadelphia mills have waiting lists of applicants for places as learners. The difficulty has been an insufficient number of instructors. This can be attributed to the existence of the closed shop until January. While the union dominated there were no non-union instructors, and most of those competent to train knitters are included in the ranks of the strikers. Learners have been intimidated and cajoled by strikers and for a time were reluctant to enter the mills. This fear has been dispelled to a great extent by the announced determination of manufacturers to keep all of the efficient in employment. When the matter of efficiency was injected into the several conferences the union representatives had the effrontery to insist that they be allowed to pass on the qualifications of a knitter. This point was, in a way, yielded by the manufacturers, but the union manifested undue interest in what might be the attitude of the fifth man on the arbitration committee consisting of two persons representative of each the manufacturers and the employees.

By conspiring successfully to keep production of full fashioned hosiery down, the union was a contributor to circumstances which sent prices up, and maintaining a stiff demand for seamless-made silk hosiery bearing the fashion mark.

Foreign trade statistics for July show no improvement in the hosiery export situation. For the first seven months of the year shipments to foreign markets were 1,580,681 dozens of cotton and 374,636 dozens of artificial silk, in contrast with a total of about 12,000,000 dozens for the year 1920. The July exports were 199,911 dozens of cotton, valued at $437,836, and 65,034 dozens of artificial silk, of a value of $263,459. The only shipments of moment to South American countries were 21,533 dozens of cotton and 5,207 of artificial silk to Argentina. Cuba, for the first time in months, was destination for worth-while shipments, taking 11,000 dozens of cotton. England took 72,892 dozens of cotton and 44,214 of artificial silk. Canada and Mexico took 24,000 and 15,000 dozens respectively of cotton hosiery. Australia almost dropped from the United States hosiery market, taking less than 4,000 dozens of cotton, in contrast with 185,000 dozens in September and 125,000 in December last year. Apparently some of the countries which last year were large buyers of American hosiery are having their wants supplied to a great extent by mills elsewhere.

It remained for cotton to call time on those jobbers who were not getting into the ring with their underwear purchases for winter requirements. Some of the jobbers sought to make it appear they might not need anything more than had been provided for in their initial orders, and some of these were received very late. It was represented among wholesalers that retailers were to blame for the deferred purchasing of winter weights—the retailers affecting to believe many jobbers had carryover stocks which later would be let go at lower figures.

There will be no dumping of underwear for the coming winter. Cotton forestalled any such movement. Whether there are or are not stocks of moment in wholesalers' warehouses, the fact remains there was a rush for goods just so soon as there came evidence of prospective sharply rising values, and incidentally, more attention was bestowed on spring lines, of which there had been some noteworthy buying in July and August.

At this writing the P. H. Hanes Knitting Co., Winston-Salem, N. C., is selling winter weights at the prices which prevailed since the opening in March, and gives no intimation of advances. The company had a very good season, which began late, however, and may be assumed to have decided to give customers the benefit of its covering for cotton before the August-September bulge. It is obvious that after the low-price cotton has been worked up the company will be forced to announce advances.

Another southern manufacturer early in September advanced its 16-pound cotton ribbed union suits to $10 from $8.75. This mill may not have been so favorably situated as to raw stock. The fact that one of the two manufacturers referred to has revised prices and the other has not, fairly illustrates the mixed situation in the underwear market.

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MANUFACTURERS OF

BONE DRY
HOSIERY FINISHING BOARDS

THAT WORK ABSOLUTELY SMOOTH

PROMPT SERVICE—RIGHT PRICES

1815 E. Boston Avenue, Philadelphia

BETTER CONTROL OF FINISH

IS OBTAINED BY BOILING-OUT
COTTON GOODS OF ALL KINDS IN

PEERLESS COMPOUND

Remarkable results are being secured through replacement of caustic boils. May we send you particulars? Specify your conditions when writing.

Write F. & S. 103 Dept. C. Maiden Lane New York City

GENERAL MACHINE WORKS

YORK, PA.

Manufacturers of

Circular Rib Knitting Machinery

Cylinders and Dials

The Walke Box Company, Inc.

NORFOLK, VA.

Manufacturers of

NORTH CAROLINA
PINE BOX SHOOKS

Conservative elements in the trade are reluctant to move prices up. Those who do so are not to be charged with trying to take advantage of market conditions; they are doing it to escape increased losses and in the hope of recouping in part the sacrifices which had been made to keep business moving when buyers were apathetic. Those whose prices remain unchanged clearly would be justified in revisions commensurate with greater replacement cost. That they have refrained from benefiting from the increased value which the jump in cotton put on their stocks of supplies reflects the general attitude of the manufacturers, which has been one of inconsistently making concessions such as are not heard of in the distributing trade. Their sacrifices have spelled gain for dealers.

While the rush to obtain winter underwear at former prices indicates a realization on the part of dealers that they must have more goods if they intend to share in the brisk season that is just around the corner, they are hesitant when even slight advances are announced, and it appears that there will remain much heavy weight underwear to be bought even after it ought to have been in the hands of retailers. Indications are there will be a scarcity of garments at times when jobbers will be most in need. Loss of production for the year amounts to from three to five months in many mills. It cannot be made up; it is like the water that has passed over the wheel.

Utter confusion prevails among jobbers, as is shown in interviews with leading houses. Some assert they have not advanced their prices. To do so, they say, would be followed instantly by like action by manufacturers. On the other hand, it was ascertained that there were jobbers whose prices went up with cotton, even before mills were quoting higher. These distributors doubtless were caught short of merchandise and were giving encouragement to those with goods to move prices up. At any rate, it was commonly known that jobbers here and there had bought for prospective needs while competitors, seeking a lower market, were sailing dangerously near the shore. Caught bare of goods, they were eager that those who had the wisdom to operate while operating was good capitalize that foreknowledge, something they were not willing manufacturers should do.

Some of the New York State underwear manufacturers executed an about-face movement in the matter of prices of fleeced goods with the flight of cotton to higher levels. Three mills were quoting under the figures of another whose lines have a national reputation in the jobbing trade. None was getting more than a sprinkling of business, the low-price mills faring no better than the other. All knew their customers were withholding orders, and that buyers were not to be moved was indicated in their indifference toward even the mills naming the lower figure. Then, when cotton pointed the way, these manufacturers moved their prices higher than those of the mill which at the start quoted for the entire season. The latter has made no change, but jobbers were showing no more interest when cotton struck 20 cents than when it was dragging around 14. It is a question whether fleeced underwear was not carried over in considerable quantity from last winter.

Much underwear for spring, as was the case with infants' mercerized socks, was bought when yarns were selling down around 21 cents basis of 10s single carded, and some of the Pennsylvania mills booked so much business that they are assured steady operation of machinery into next year. There remain, however, a great many jobbers who have yet to come into the market. These will pay more than the early buyers, who contracted for goods at prices based on low value cotton.

A leading mill selling direct to the retail trade sent its salesmen on the road with spring samples in the third week in September. Its lines had been priced on 14-cent cotton, and it was intended to sell allotments on that basis for a time, to give every patron of the mill opportunity to get some low-price underwear. It is stated at the mill office that so soon as staple settles, prices will be adjusted to the then cost; that the mill will refuse to sell cotton at 14 cents when it is commanding four to five cents more a pound.

A 16-pound cotton union suit from one mill selling to retailers has been advanced to $13.25 from $12, and another number to $15 from $13.50. These are for winter. It seems not unlikely that prices for spring garments will be moved proportionately, about 12½ to 15 per cent.

A department store was a quite recent buyer of winter underwear at the advances. This establishment usually places its orders for winter goods along in May and June. It overstayed the market, as did several of the very large department stores. Consumers will pay the cost of buyers waiting.

Among the Knitting Mills.

The Ulrichsville Knitting Co., Columbus, Ohio, has been organized with a capital of $150,000, to manufacture men's and women's hosiery and other knit goods specialties. The company will operate a mill at Ulrichsville, Ohio.

Machinery and equipment will be installed in the new plant annex of the Excelsior Knitting Co., Orwigsburg, Pa., now nearing completion.

The Triangle Knitting Mills, Allentown, Pa., manufacturers of jerseys and other knit goods products, have leased property at Marshall and Spring Streets, Philadelphia, Pa., for the establishment of a new plant. Following machinery installation the mill will be placed in service.

The M. & M. Knitting Mills, Philadelphia, Pa., have been chartered under state laws to operate a local plant for the manufacture of knit goods products. Louis Malamut, 6238 Pine Street, is treasurer.

The Watco Knitting Co., Phoenixville, Pa., manufacturers of cotton underwear and other knit goods specialties, is having plans prepared for the erection of a new three-story addition to its plant. The proposed structure will be 36 x 80 feet, and will be equipped for general production. J. V. Poley, Royersford, Pa., is architect for the work.

D. J. Rothstein, Philadelphia, Pa., formerly associated with the Knit Wear Corporation, is reported to have established a mill located on Mascher Street near Columbia Avenue, for the manufacture of cotton jerseys, and other specialties.

The Revere Knitting Mills, Malden, Mass., manufacturers of cotton knit goods specialties, etc., has awarded a contract for the erection of a two-story, brick and concrete plant addition, 50 x 100 feet. The proposed structure will

be located on Eastern Avenue and will cost about $50,000. for general operation.

The Goodman Hosiery Mills, Indianapolis, Ind., manufacturer of women's and children's hosiery, have awarded a contract for the construction of a new addition to its plant. The addition will be a top-story to the present two-story structure, 25 x 125 feet, and is estimated to cost about $150,000. New machinery and equipment will be installed for general operation.

The Golden Belt Manufacturing Company, Durham, N. C., manufacturers of sheetings, tobacco bags and hosiery, are installing a number of knitting machines.

The Griffin Hosiery Mills, of Griffin, Ga., have purchased the entire property of the Kincaid Knitting Mills, at Griffin, and are installing new machinery to manufacture children's socks. This will be known as Griffin Hosiery Mill No. 2. The No. 1 mill of the company will begin the manufacture of high quality silk hose for women. Woolheather stockings will also be made at this plant.

The Maidwell Hosiery Co., Riverside, N. C., has been incorporated and will erect a plant for the manufacture of hosiery and other knit goods.

The Peoples Knitting Mills, Inc., of Brooklyn, N. Y., have been incorporated by Barnet Bergman, Samuel Noscakovitz and Samuel Joseph. The capitalization is $70,000.

The William Penn Knitting Mills, recently organized at Philadelphia, Pa., will specialize in the manufacture of a high grade line of ladies' pure silk sweaters.

The Albert Hosiery Company has been formed at Philadelphia, Pa., for the manufacture of hosiery and knit specialties.

Application has been made for a charter of incorporation at Philadelphia, Pa., by a concern to be known as the Fair-Trade Hosiery Knitting Mills.

Grauer Brothers, Philadelphia, Pa., are to establish a plant for ornamenting and clocking hosiery, it is reported.

The Yarn Market.

A gradual, certain upward movement of prices throughout the whole list occurred in the Philadelphia cotton yarn market during the past month, as a result of several bullish influences which affected the market directly. The result of the increased rates was that the morale of the market was wrecked somewhat, and orders for yarns were not frequent, but inquiries were received in rather encouraging numbers.

One direct cause of the action of the sellers in putting up prices was, naturally, the new lease that raw cotton took on life, and the resultant increases in raw cotton rates. When the price on the staple would increase, yarns would take a spurt, a jump here, an increase, an advance there, and soon yarns in general found themselves on a higher plane than that upon which they had rested a few weeks before. An accompanying effect on yarn prices was the exceedingly short cotton crop estimate as issued by the Government, and the gradual realization of the factors in the market that there is to be a scarcity on this year's crop. And, also, as was pointed out here last month, spinners declared themselves unwilling to continue manufacturing products and selling them at a price below cost of production, the case in many instances, and consequently they took a firmer stand.

To show how this advance came into the list, we will illustrate by charting the course of prices on 30s southern frame spun carded yarn on cones.

On the first day of August, 30s in this grade were quoted on the average at 29 cents a pound (and this, incidentally, was two and a half cents above the level they had been maintaining for about a month). On August 15th, an average price of 29½ cents was being offered for them, while from August 24 to August 29, they took a jump in price from 33 cents to 36 and 37 cents. On September 2, 40 cents was asked, and on September 15 they were bidding 40 cents with 41 cents asked.

This example is typical of the entire list, practically, and the effect of the suddenly higher rates was to place the market in a very irregular and demoralized condition. Buying practically ceased, as that end did not want to invest on an unsettled market, and the selling side was not overanxious to sell for the same reason.

Combed yarns seemed to get the majority of what business was transacted, and during the last week, as we write, business does seem to be picking up, and considerable inquiries are coming in, though these latter, it is told, are more for keeping informed as to the trend of the market rather than coming in as harbingers for business. Spinners are holding to their prices firmly, evidently believing in the ability of the cotton advance to be permanent, the buyers are holding to their purchase orders, and the market is in an unsettled condition as a result of the rapid price increase.

Quotations on the Philadelphia yarn market, as of September 15, follow:

Southern Single Skeins.

4s to 8s	31	10s	31½
12s	32	14s	32½
16s	33	20s	35
24s	36	26s	36½
30s	39		

Southern Single Warps.

8s	32½	10s	33
12s	33½	14s	34
16s	34½	20s	35 @36
26s	37½	30s	40
40s	50 @52		

Carpet and Upholstery Yarn in Skeins.

8-2-4 tinged tubes	24½
8s and 9s 3-4 slack	29
8-3-4 hard white warp-twist	28
8-3-4 hard twist waste	28

Southern Two-Ply Skeins.

8s	31½	10s	32
12s	32½	14s	33
16s	34	20s	35½
24s	36½	26s	37½
30s	38 @40	40s	50

Southern Two-Ply Warps.

8s	33½	10s	34
12s	34½	14s	35
16s	35½	20s	36 @38
24s	38	26s	28½
30s	40 @41	40s	50 @55

Southern Two-Ply Combed Peeler Skeins and Warps.

8s to 10s	57	20s	60
24s	63	30s	70
40s	85	50s	90
60s	$1 05	70s	$1.20
80s	$1 30		

Southern Frame Spun Carded Yarn on Cones.

8s	33½	10s	34
12s	35	14s	35½
16s	36	18s	36
20s	36½ @37	22s	37½
24s	38½	26s	39½
30s	40 @41	40s	52 @54
30s double carded			44@46
30s tying-in			38@40

Northern Mule Spun Carded Yarn Cones.

10s	35	12s	36
14s	37	16s	38
18s	38½	20s	39
24s	41	26s	44
30s	46	40s	54

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	45	12s	46
14s	47	16s	48
18s	49	20s	50
22s	52	26s	56
36s	69	28s	71
28s	58	30s	60
40s	73		

"The Wheel of Progress"

Protect Your Own Business

The cotton business is booming.

Mills are reopening—some manufacturers are unable to supply the demand for cotton goods.

The world is growing. Cotton goods are necessary to its health and prosperity.

Cotton mills must expand. They will do more and more business.

* * *

The "Philadelphia Public Ledger," on August 16th, said that power plants of the United States are operating near capacity, that much additional development will be necessary to meet the demand for power as industrial activity increases.

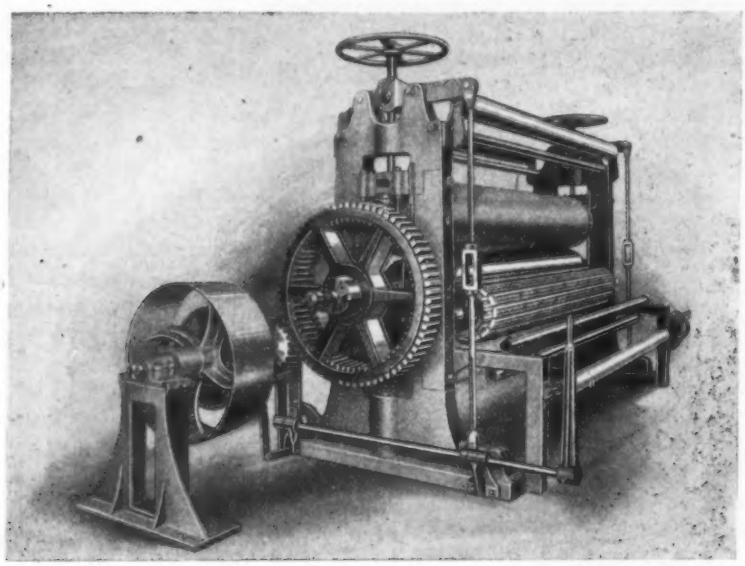
Power Plant Companies, Public Utilities, can only expand as they are able to secure additional capital.

Capital must be coaxed and invited by fair treatment, and an opportunity to earn a fair return on its investment.

The development of the cotton industry depends on water power development. Water power development is dependent on the kind of treatment which public utility companies receive at the hands of the public.

Georgia Railway & Power Company

BUTTERWORTH



CALENDER (Three Rolls)

WE have certain theories of construction which are expressed in Butterworth Finishing Machinery. They have been tested and retested by 101 years of considering the finishing needs of the textile industry and creating the machines that fill them. These principles are your assurance of satisfaction.

H. W. BUTTERWORTH & SONS CO.

Established 1820

PHILADELPHIA

PROVIDENCE OFFICE
Turk's Head Building

Canadian Representative
W. J. WESTAWAY COMPANY
Hamilton, Ontario, Canada

AGEING MACHINES
BLEACHING MACHINES
DRYING MACHINES
SINGEING MACHINES
MERCERIZING RANGES
HYDRAULIC PRESSES

FINISHING
Butterworth
MACHINERY

DYEING MACHINES
SOAPING MACHINES
TENTERING MACHINES
MANGLES (all kinds)
CALENDERS (all kinds)
COLOR KETTLES
CELL DRYERS

TOLHURST EXTRACTORS

It would be difficult to go through any New England textile mill and not find a TOLHURST machine. Here, for instance, is a battery of 40″ TOLHURST "Self-Balancing" Extractors installed in a leading Massachusetts plant, famous for its production of prints, fancy cottons and worsted goods. First used by this mill in 1893, repeat orders have since followed in orderly sequence.

Details relative to the notable work TOLHURST Extractors are doing here and elsewhere are at the disposal of all interested in centrifugal extraction. We build machines suitable to all requirements.

TOLHURST "Self-Balancing" Extractors, flexible bearings, motor, countershaft or engine drive from above or below—diameters 12″-72″.

TOLHURST "Center-Slung" Extractors, open top, grease-lubricated roller bearings, countershaft or motor under-drive, baskets 40″ and 48″, flexibly slung.

And other types.

Catalogue on request.

TOLHURST MACHINE WORKS

Established 1852 **TROY, NEW YORK**

New York Office, 111 Broadway

Southern Rep.:
Fred H. White,
Realty Bldg.,
Charlotte, N. C.

Western Rep.:
John S. Gage,
Hartford Bldg.,
Chicago, Ill.

San Francisco Rep.:
B. M. Pilhashy,
Merchants Ex. Bldg.,
San Francisco, Cal.

Canadian Rep.:
W. J. Westaway Co.,
Main & McNab Sts., Hamilton, Ont.
400 McGill Bldg., Montreal.

How a Mill Eliminated Re-dyeing

A prominent mill producing cotton and silk piece goods experienced much trouble and many losses in re-dyeing. Dark streaks and blotches on light shades, and light streaks and blotches on dark shades; also variations in shades were common occurrences that caused considerable re-dyeing and cost the mill much money.

A Permutit Zeolite Water Softener was installed to remove all the hardness from the water supply and tremendous improvements were at once noted.

All *blotches and streaks* immediately disappeared. They had been caused by the hardness in water that deposited insoluble soap curds in the fibres of the fabric, preventing the dye from taking evenly.

Variations in shades no longer occurred, for Permutit Softened Water is absolutely uniform at all times, and the changes in hardness that cause colors to vary are entirely done away with.

This mill is now manufacturing economically and dependably, as the high quality of their *soft water made products* brings additional revenue and reputation.

There is a Permutit solution to every problem. All analyses and investigations free of charge.

This booklet contains valuable information that every mill operator should have. Sent free, postpaid, upon request.

Zeolite Water Softener Patent Sustained

The Federal Court at Buffalo (Hazel J.) on June 15, 1921, handed down a decision sustaining our broad patent covering Zeolite Water Softeners. According to this decision all Zeolite Water Softeners on the market not made by us are an infringement of this patent.

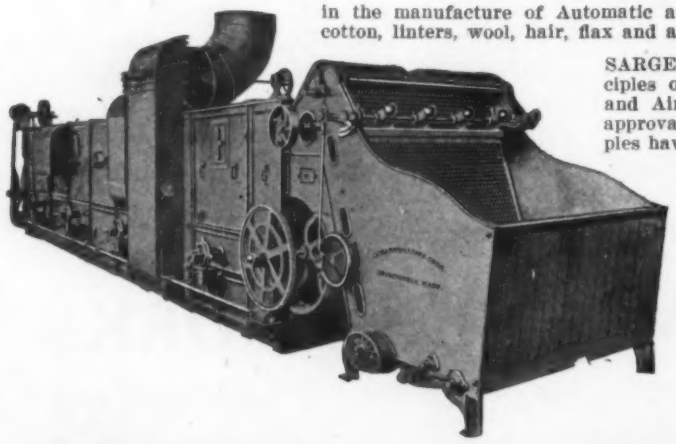
No need to borrow trouble—buy Permutit—it is the best anyway.

The Permutit Company
440 Fourth Ave. New York

Filters—Water Softeners—Special Apparatus

The Development of 35 Years' Study and Experience

in the manufacture of Automatic and Continuous Drying Machinery for drying cotton, linters, wool, hair, flax and any raw material.



SARGENT DRYERS are constructed on basic principles of Automatic Feeding, Continuous Conveying, and Air Circulation, which for years have had the approval of expert drying engineers. These principles have been so combined and adapted as to make a complete machine which is unexcelled.

Sargent Dryers are built in over fifty standard sizes and in various combinations and special designs, admitting their widest range of use. Before recommending any dryer we always wish to know as many facts concerning the problem, so that we may furnish a machine that will give entire satisfaction. We are glad to confer with you and give every assistance possible.

Write today and let us explain the principles of SARGENT DRYERS.

C. G. SARGENT'S SONS CORP.
GRANITEVILLE, MASS.
Fred H. White, Southern Agent, Charlotte, N. C.

Sargent Dryers

The Labor-difference in Franklin Package Dyeing

In previous advertisements we have told of savings in fuel, water, dyes, chemicals, floor space and yarn effected by the use of Franklin equipment.

THERE is a certain degree of skill, facility, or whatever you wish to call it, required in the handling of skeins and warps during the dyeing process.

The **wound packages** which go into Franklin Dyeing Machines can be handled—loaded or unloaded—efficiently by inexperienced workers.

A difference in the **kind** of labor required which must of necessity influence **cost.**

The compactness of the packages used, the intensified capacity per man brought about by Franklin Machines have a marked and even **remarkable** influence on the **amount** of labor required. A second condition which of necessity influences **cost.**

For example,—if you employ thirty men in your dye house and pay an average wage of 50c an hour, we can save you through the installation of Franklin Machines something like $22,000.00 in one year on your dye house payroll alone.

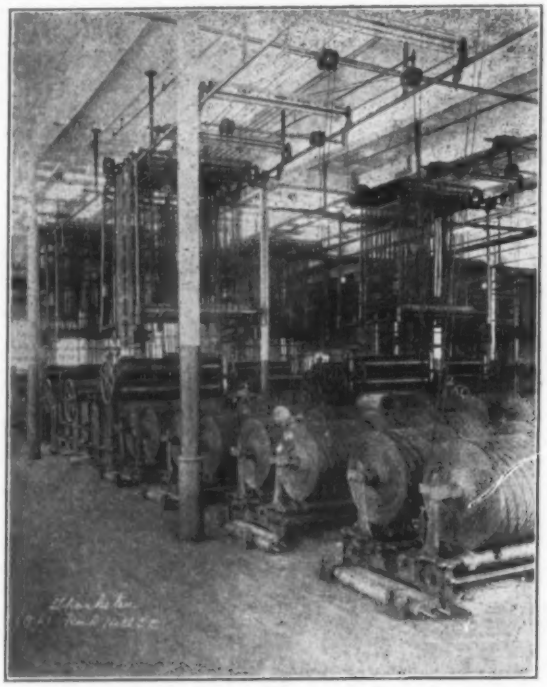
And in the face of that almost startling fact we are prepared to show you that, where Franklin Machines are used, **the greatest** total saving in labor actually comes outside the dye house in the reduction of **handling** in preparation for dyeing and after dyeing—as the result of

FRANKLIN DYEING IN COMPACT, WOUND-PACKAGE FORM.

FRANKLIN PROCESS

Philadelphia CO. Manchester, Eng.

PROVIDENCE, RHODE ISLAND, U. S. A.



Continuous System Indigo Dyeing Equipment for Warps

In the equipment illustrated fifteen warps are led through a Two Compartment Boiling Out and Cooling Machine, through two Indigo Vats, and taken up by Dye House Ballers in one operation in an initial run.

In a second run the fifteen warps are led through two Indigo Vats, and are taken up by Dye House Ballers.

In a third or finishing run, five of these warps are led through a Two Compartment Wash Box operating in connection with the Dry Cans equipped with a five-unit Coiler.

The successful handling of warps through Continuous Dyeing Systems such as described is only possible through the use of Automatic Tension Controls and Regulators such as we build and use with our Dyeing Equipments.

For further particulars and prices, write or wire

Cocker Machine & Foundry Co.

Gastonia, N. C.

Builders of Warpers, Beamers, Warp Dyeing Machinery

WARPING MACHINERY

Linking Warpers—Linker Heads—Balling Warpers—Balling Attachments—Section Beam Warpers—Special Warpers.

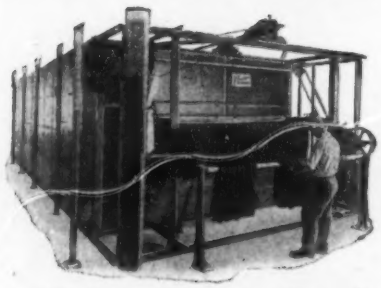
WARP BEAMING MACHINERY

Long Chain Beamers—Short Chain Beamers—Warp Splitters—Special Beaming Machinery.

WARP DYEING MACHINERY

Boiling Out Boxes—Continuous Systems—Sizing Machines—Doubling and Splitting Systems—Sulphur Machines—Indigo Vats—Warp Coilers—Dye House Ballers—Hydro Sulphite Equipment—Warp Bleaching Equipment—Drying Cans.

DRYING



The "Proctor" Automatic Yarn Dryer

for all kinds of yarn in skeins. Combines highest quality drying with most efficient operation. Saves time, trouble, labor and space. Send for a catalogue.

PROCTOR & SCHWARTZ, INC.

formerly The Philadelphia Textile Mach'y Co.

PHILADELPHIA, PA.

"Proctor" DRYERS

DURABLE K-W UNIVERSALLY USED

KLAUDER - WELDON DYEING - BLEACHING-SCOURING MACHINERY

There are K-W machines in use which were built nearly half a century ago and which are still doing their work efficiently and economically under severe service. This is sufficient evidence of the durability and capability of K-W Machines after long years of subjection to the ravages of live steam, heat and alkalis.

K-W Machinery by its accomplishments, has steadily and irresistibly built up a reputation that has made the name "Klauder-Weldon" synonymous with the "world's best dyeing, bleaching and finishing machinery."

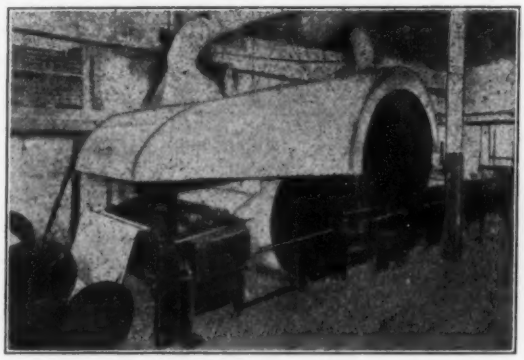
Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions without obligation on your part whatsoever.

Write today for K-W Literature

THE KLAUDER-WELDON DYEING MACHINE CO.

Bethayres, Pa., U. S. A.

H. G. Mayer, Southern Agent,
Realty Bldg., Charlotte, N. C.



Pickens Slasher Hoods have been installed at Saxon Mills, Spartanburg, S. C.

Improve Your Sizing Methods

Every slasher room has a great amount of heat and moisture in it, due to the sizing of the yarn and its proper drying.

Where this moisture and heat is not properly exhausted, the heat and moisture combined make the room almost unbearable to work in, and prevent efficient and satisfactory results.

All of these faults are overcome and more work and better results are obtained when you install

Pickens Slasher Hoods

1—The hood covers both cylinders, including the size box. This causes the yarn to dry more readily than if the hood did not extend entirely over all of the slasher apparatus.

2—The hood is divided into two compartments by means of a baffle. This baffle has a sub-baffle, which is adjustable to suit the various conditions under which the hood is worked.

3—The hood has a slotted opening over the large cylinder and over the size-box. This opening runs the entire width the hood and picks the steam up in a row. Ase the steam is generated in a row it is very clear that this method has advantages over any other method.

4—Connected to these slots or openings in hood are placed dome-shaped connections terminating into 12-inch round pipe or larger. Former tests prove that a 12-inch pipe connected to each gives more satisfactory results than one 10-inch and 15-inch, as used in the two hood system.

5—Extending entirely around the hood over size-box is a condensation gutter. This catches the condensed steam or vapor and conveys it into one tube, which prevents any water falling on the yarn and spoiling the same.

6—Hoods are made in sections, numbered consecutively. Any mechanic with a pair of plyers and a screw driver can replace any section that wears or rusts out.

7—Making the hood in sections they are very easily shipped and erected anywhere. Erection being done by any mechanic.

8—All parts being interchangeable, the upkeep is very low.

Twenty years of experience has enabled us to produce the finest and most perfect hood on the market today.

A Demonstration will prove this assertion—
Do you want one?

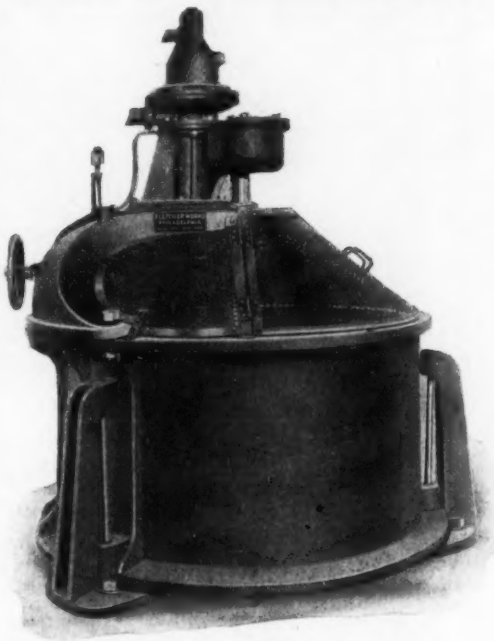
FULL DETAILS ON REQUEST.

R. O. Pickens Slasher Hood Co.

SPARTANBURG, S. C.

Steam Turbine Driven

HYDRO EXTRACTORS



The Most Satisfactory Drive Where Steam is Available

Turbine is entirely Enclosed.
Belt troubles are eliminated.
Speed closely regulated by reliable governor.
No Packing Boxes to Stuff; no piston rings or slide valves to wear; no bearings to be taken up.
Ball bearings throughout running in oil baths.
Exhaust steam is clean and can be used for boil-off, heating or drying.
No open working parts to gather oil and dust, or throw oil on the goods.
Basket can be started in any position.

FLETCHER WORKS

FORMERLY SCHAUM & UHLINGER

Glenwood Avenue at Second Street
PHILADELPHIA, U. S. A.

Sales Agents:

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R. R. STREET & CO.
28 N. Clinton Street
CHICAGO, ILL.

"DEVELOPENE"

Leaves No Argument as to When

"BLACK IS BLACK"

WHY BE SATISFIED

with a RUSTY BLACK when you can have a RICH LUSTROUS BLACK by finishing your Hosiery with the latest, most efficient and satisfying patented preparation

"DEVELOPENE"

A Demonstration Will Convince You

Send us a pair of unfinished stockings, skein of yarn or a piece of fabric—cotton, silk, artificial silk, wool or mixes—which has been dyed black, washed but not finished. We will finish it with "DEVELOPENE" and return to you.

There will be such an improvement that you will immediately want "DEVELOPENE" for finishing your goods.

No further softener—or soap—required. Makes hosiery slip on and off the board easily—leaves the product soft and pliable.

Manufactured Only by the

KALI MFG. CO.

1404-1410 North Front St.

PHILADELPHIA, PA.

Sole Manufacturers of

Hydroxy Oil and Sodium Sulphide Single and Double Strength Kali Chlorine Neutralizer

NORWOOD

MECHANICAL FILTER PLANTS

Gravity and Pressure Types.

ESPECIALLY DESIGNED TO MEET ALL TEXTILE REQUIREMENTS

Write for Information.

NORWOOD ENGINEERING COMPANY

FLORENCE, MASS., U. S. A.

CHAS. M. SETZER,

Southern Representative,

Charlotte, N. C.

SURPASS CHEMICAL CO. INC. PIONEERS IN AUTOGYP PROCESS OF DYEING

AUTOGYP

PATENTED IN U.S.A. SEP. 26, 1916 IN CANADA OCT. 10, 1916

ALBANY, N.Y.

Simple As A B C's

One operation, using the AUTO-GYP Process bleaches and dyes at the same time. It's as simple as A B C's and effects great economies.

The material direct from the knitting machine, is run into the dyeing machine, and thoroughly wet out in any convenient manner. Sufficient cold water to thoroughly cool the bath and in which to properly work the material is now run into the machine. 2 or 3 per cent of Autogyp dissolved in cold water and suitably diluted is now added to the bath. The necessary dyestuff in a wel ldiluted solution is then slowly added to the bath and the goods allowed to run 10 minutes. Steam is then turned on and the bath allowed to come to a boil very slowly and gradually held at or close to a gentle boil for one hour; steam is then shut off and the goods allowed to run 45 minutes longer without steam.

The Bath is then drawn off and the goods rinsed twice and extracted.

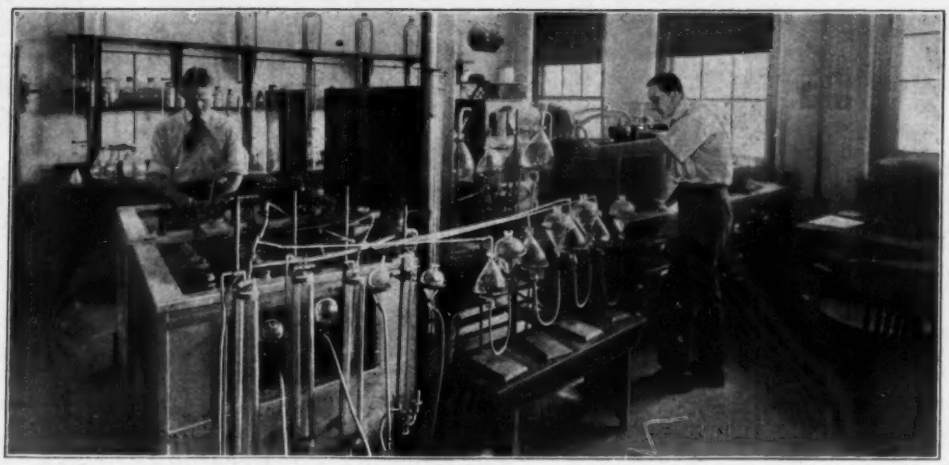
—AND THAT'S ALL.

Write for full information.

SURPASS CHEMICAL CO., Albany, N. Y.

AUTO GYP

Process of Dyeing



In this laboratory, solubility research is conducted on the materials used in the production of dyes as well as the products of the intermediate processes.

One Building of the Jackson Laboratory Group for Dye Research

DU PONT UNION COLORS

We now offer a complete range of dyestuffs for use in garment dyeing. They are most carefully standardized, being suitable for solid shades on material consisting of cotton, wool and silk.

Du Pont Union Dyes are easy to apply, level dyeing, giving good penetration of the seams, and possessing the necessary fastness requirements for this class of work.

Solubility of Dyestuffs

The solubility of a dyestuff is one of its most important qualities. A dye which is perfectly soluble, in the vast majority of cases, is one that has been prepared from pure intermediates by the correct formula.

But an intermediate to be pure must also be perfectly soluble, the while being free from all foreign soluble matter. Very often the only way of separating two or more intimately associated chemicals is by taking advantage of the differences in their solubilities.

Purity, solubility and identity are qualities possible in every chemical compound, but they are interdependent.

The purity and solubility of Du Pont Dyestuffs are the result of a thorough knowledge of all the qualities of the chemicals that go to make them. Note their solubility.

E. I. du Pont de Nemours & Co., Inc.
Dyestuffs Department
WILMINGTON, DELAWARE

Branch Offices
New York Boston Providence
Philadelphia Chicago
Charlotte, N. C.

DU PONT DYESTUFFS

AN OPEN LETTER ON COTTON WARP SIZING

Mr. Cotton Mill Executive:

An authority on the chemistry of practice and cotton warp sizing states: Many cotton manufacturers would be astonished at the amount of saving that could be effected in their sizing process if they could only be persuaded that positive results could be obtained on a more efficient basis, at a very much lower cost, with modern highly standardized commodities.

Our Textile Laboratory, cognizant of the vital importance of the primary treatment of the cotton warp and its relation to the subsequent processes, has, in no small degree, demonstrated the truth of the foregoing statement in New England and Southern cotton mills during the past decade.

AMALOL and GLUANTINE are displacing older methods wherever used and invariably show an appreciable saving from start to finish. Let us prove to you the ready adaptability of AMALOL and GLUANTINE in your plant, and moreover, do not fail to read the interesting literature that has recently been sent you.

We will gladly ship you on approval a barrel each, and furnish correct formula for your individual requirements.

List of users gladly furnished.

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Textile Products Division
262 Pearl Street, New York City

STAUSS
SOLUBLE 68 per cent TALLOW

Stauss 68% Soluble Tallow and Gum—Soluble Oils

for all warp sizing and finishing purposes.
None better.
Manufactured by Geo. P. Stauss,

Importers and Distributors of
Starches, Softeners, Weighting Compounds

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Southern Distributing Company
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The following can be supplied F. O. B. New York
Alizarine Red 20% all shades
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All Mathieson Chemicals are manufactured exclusively by us in our two plants. Throughout the process of manufacture, step by step, Mathieson products are tested for purity and uniformity. Every ounce must come up to Mathieson quality before it is passed.

LIQUID CHLORINE, 100% pure, anhydrous—BLEACHING POWDER, the highest test manufactured—SODA ASH, 58%, both light and dense shipped in bulk, in bags and barrels—CAUSTIC SODA, 60, 70, 74, 76 and 78 per cent grades. The electrolytic 78% grade, analyzing 99.7% hydrate of soda, is the purest caustic known—VIRGINIA SODA (Sesquicarbonate of Soda), a beautiful white crystalline neutral soda, uniform in character and action—BICARBONATE OF SODA (U. S. P.) and CHLORINE SOLVENTS.

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It

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are strangers, why not test them on our guarantee of satisfaction or money refunded? You may be happily surprised.

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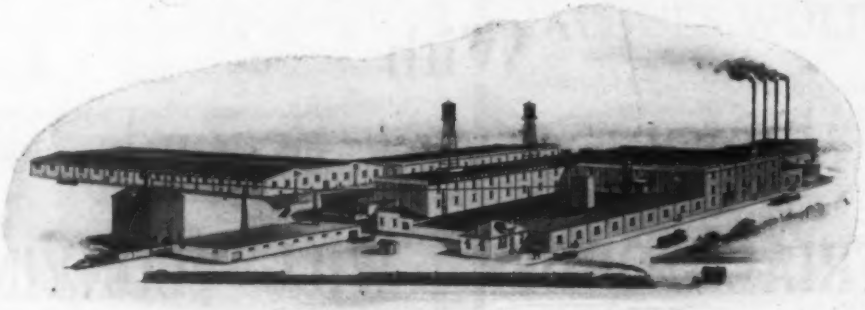

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The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

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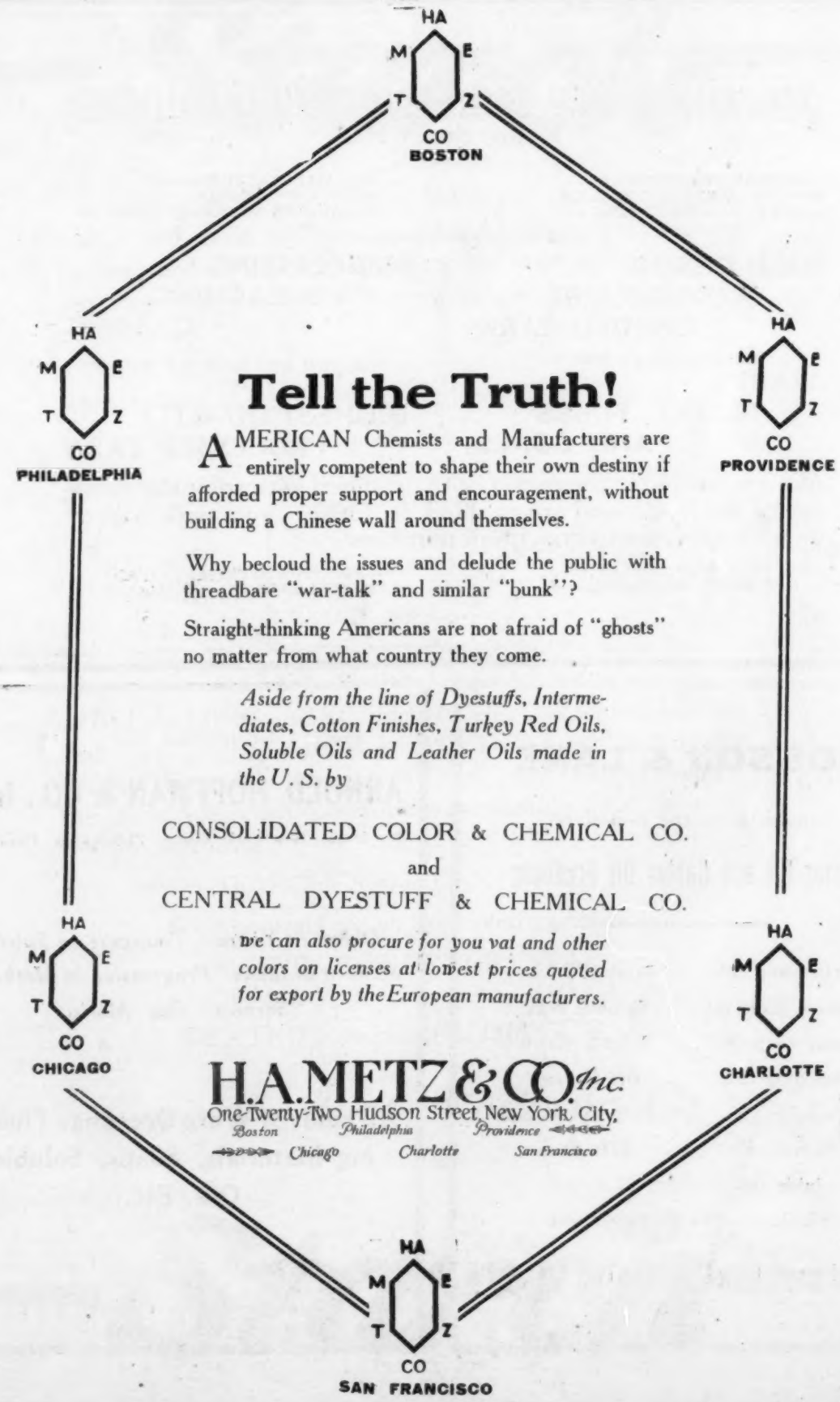
If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.



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We know and can provide the proper type of Starch.

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"It Prevents Harshness"

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Is INDISPENSABLE
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LIGHT AND STRONG. IMPROVES YOUR PUT UP.

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Numbered among our most satisfied customers are some of the largest mills in the South, for whom we print time cards, time sheets, and their various printed and special ruled forms

Our plant is one of the largest and most completely equipped printing plants in the South. Our long experience enables us to produce the most perfect printing and service, and our large volume and purchasing power enable us to save you money on your printing.

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Boston Clocks tell just what the production from each frame actually is

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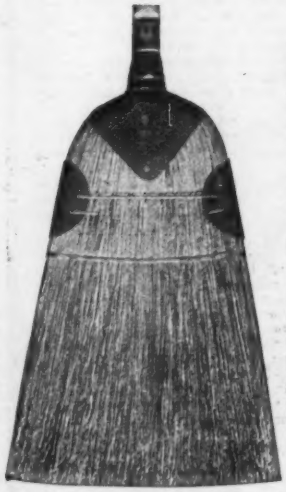
Is the IDEAL Cotton Mill Broom



Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of of broom corn to be used, thus giving them excellent sweeping qualities.

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Inquiries and orders receive prompt attention.
Sold direct and through
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Evansville, Indiana

Free Proof That You Can Get Business from the Cotton Mills

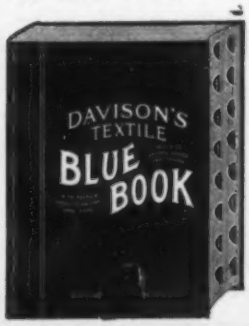
From $75.00 to $3,000 or more a week—that is what I did for more than one firm. Another firm says I will be worth possibly $10,000 to them. "Our business was increased $25,000 a year" another informs us. A well-known mill supply house reports an increased business of $2,000 the first week they used me. Does that sound good?

The truth is—to add $75.00 to $3,000 a week to any firm's business is commonplace for me. I'm doing it for hundreds of firms.

Why not let me show you the fertile and extensive markets at your command, the names of buyers of your products? I'll show you just how to reach them, explain the difference in the size of one textile establishment from another, tell you their capital, number of looms or other machines they operate, how many they employ and kind of power they use. I'll quietly advise you each superintendent's, treasurer's and other official's name, how long each mill has been in business, what they make, who sells it in New York or other sales points, and I'll show you what railroad reaches each mill.

Besides all this, I know and am able to tell you every mill making the same kind of goods or yarns as other mills, so you may either sell all competitors of your present customers, or buy from many manufacturers making the same article.

Listen—I am able to do this and more, because I've been at it for thirty-five years. I'm not one, but an organization of trained specialists, older experienced business men, middle aged live wires with fifteen to twenty years' association and actual contact with the textile industry, keen minded young women who have particular training for this exacting work, and young, energetic, clean cut travelers who know all branches of the textile trade.



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Yours for success,

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We make a specialty of Harness for Warp Drawing Machines

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AUTOMATIC

STOP-MOTION DEVICE

for

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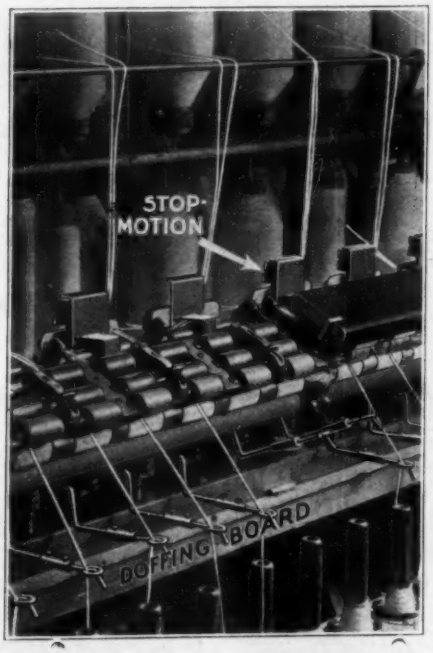

Here is a **new** device which the instant the end breaks the Stop-Motion operates automatically, severs the roving back of the rolls and prevents the formation of waste. Practically **all** of the roving is converted into yarn.

The prevention of waste is only **one** of the accomplishments of the Eclipse Automatic Stop-Motion. Let us tell you more about it. Write us.

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Ice and Water Cooled

INVESTIGATE THE NEW IDEA

This is one of many Types.

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Last word in Ice - Cooled Fountains

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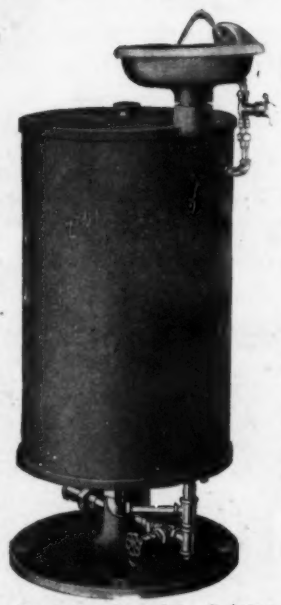
TWO TANKS —Ice in one and waste cold water from Bubbler in the other



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LET us furnish estimates on your painting. We can refer you to scores of big mills throughout the United States that we have painted.

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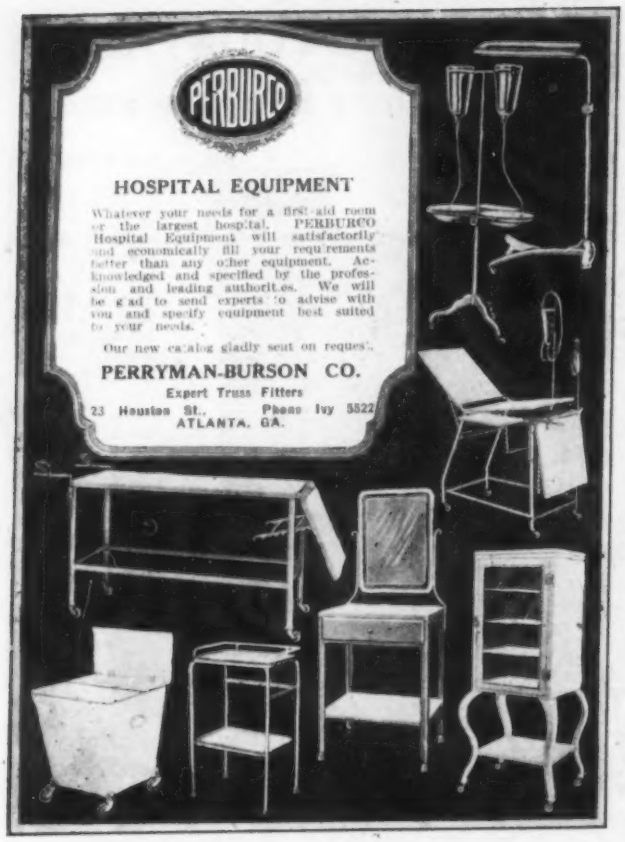
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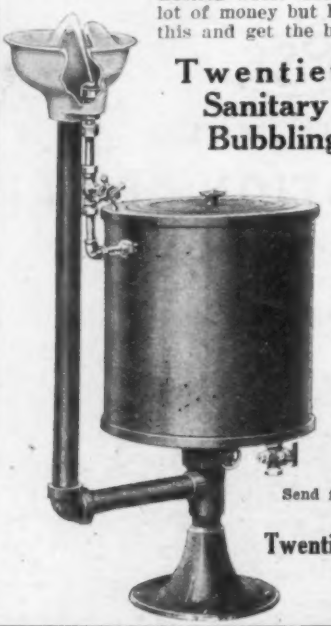
Bottled water and paper cups run into a lot of money but here's how you save all this and get the best results



Twentieth Century Sanitary Ice-Cooled Bubbling Fountains

are for attachment to city water supply and they supply ice-cooled water which is much more sanitary than "ice-water."

They hold 75 pounds of ice—will supply 50 to 75 people. Self-cleaning, do not harbor germs, use less ice than ordinary water coolers—are durable in construction and attractive in looks.

Our Bubbler Heads are absolutely non-squirting and give forth a steady, easily-regulated stream.

Send for complete catalog and prices.

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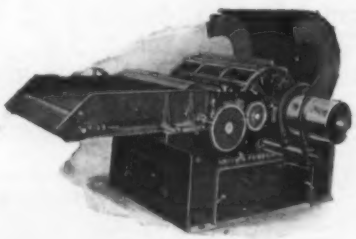

Jute Picker
Send for Circular S-166

This machine is used for shredding or hackling out Gunny and Burlap bagging.

It is used as a part of our outfit for the manufacture of gunny sacking from scrap bagging.

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Means contented workmen, and contented workmen means better work and more of it. Coincident with the wave of receding wages that is sweeping over the land far-seeing employers are taking heed of the little things that go far toward making their employees contented and not the least of these is to keep the working place clean and inviting.

The "Two-in-One" Combination Sweep and Scrubbing Brush fits into the new requirements of the times because it is made to lessen toil and do effective work at the same time. Its use in any mill or workshop means absolute cleanliness, a big saving in labor cost, and minimum outlay in replacement. Write for catalogue and price list of brooms and brushes of all kinds.

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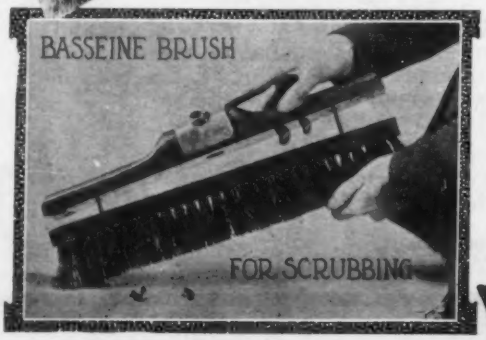

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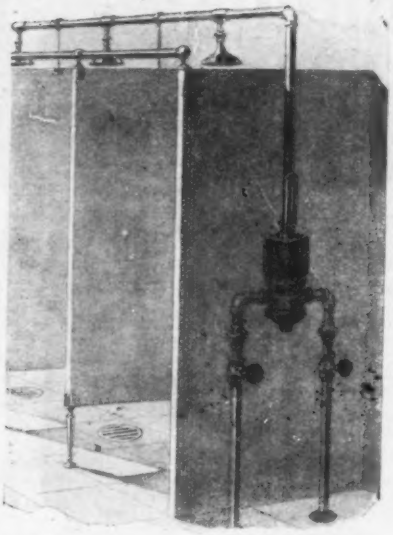

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Wash Sinks and Shower Baths should be made safe against scalding by the use of

The Powers Hot Water Line Controller

Scalding water cannot pass through this controller, but it will deliver water at any desired temperature below the danger point. Provided with variable or locked adjustment. Failure of either the cold or hot water shuts off the supply.

Economical, easily installed, handsomely finished. Saves fixtures, too.

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No "bad cloth" when you weave with "DUPLEX" FLAT STEEL LOOM HARNESS

STEEL HEDDLE MFG. CO.

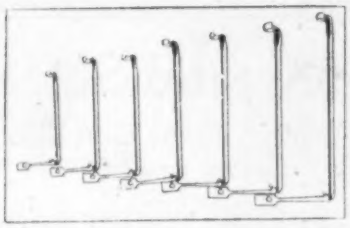
GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

11 Washington St. Greenville, S. C.

Hampton Smith, Southern Manager

N. B.—We are the sole manufacturers of nickel-plated drop wires for every kind of loom.



You Don't Need to Guess

When ordering your

FLYER PRESSERS

from us as to whether they'll fit or not.

We take care of that at the factory.

When they are delivered to you, they've been Fitted Perfectly, Polished, ready for INSTANT SERVICE, backed by our GUARANTEE.

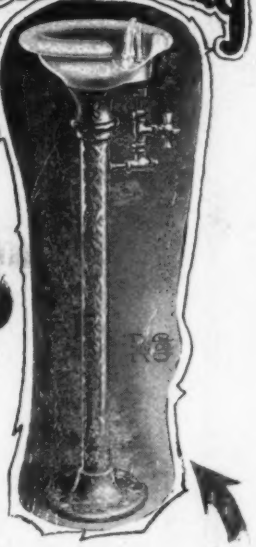
LET US PROVE IT.

Southern Spindle & Flyer Co.

Charlotte, N. C.

W. H. MONTY, President
W. H. HUTCHINS, Vice-Pres. & Sec.

A Sanitary Drinking Fountain BEYOND Criticism



SUCH was the comment of a drinking fountain expert to whom our fountain was submitted.

In the "VERTICO SLANT" Sanitary Drinking Fountain there is no opportunity for contamination between the crest of the jet and the nozzle, as all the water falls to one side.

Copious drinking as the lips touch the stream at a point where the water loses its momentum.

THE LOCATION OF THE NOZZLE IS SUCH THAT IT CANNOT BE TOUCHED WITH THE LIPS.

Write for Details.

RUNDLE-SPENCE MFG. CO., Milwaukee, Wis.

74-page Drinking Fountain Catalog "C" is ready for distribution.

The Palmer Adjustible Thread Guide

For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - - Connecticut

VOGEL

PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

Enameled Roll flushing rim bowls.

Heavy brass valves.

Strong hardwood seat.

Galvanized tank.

Malleable seat castings will not break.

Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.

WILMINGTON
DELAWARE

A Comparison of Drinking Fountain Streams

Vertical Stream Bubbler Condemned Everywhere

Camouflaged Vertical Stream

Rainbow stream. Hose-like. difficult to drink from.

No. 1 shows the vertical stream which permits saliva and waste water from the drinker's mouth to fall back to the source of supply. No longer considered sanitary.

No. 2. is a slight modification of vertical stream type. This slight angle is little if any improvement over No. 1.

No. 3 is more sanitary if properly used. But stream is hose-like with no definite drinking point. Drinker places mouth as near water outlet as possible. Unsanitary like Nos. 1 and 2.

The Puritan Cantonment "Mound Building" Stream

Practical drinking mound is formed by mechanical means. Interference is set up in stream which retards water movement at the apex of arc. This stream makes it impractical to drink from any other point.

Approved by U. S. Government. Now recognized by largest interests and schools in the country.

—Definite Drinking Point.
—Sanitary and Practical.

Puritan CANTONMENT DRINKING FOUNTAINS

Puritan "Cantonment" Coolers are designed to connect to pressure lines and are so constructed that the drinking water does not come in direct contact with either the ice or ice water, but is circulated through brass coil which is tinned both inside and outside.

With 2-stream "Mound Building" Projector this cooler is the most efficient and sanitary of its kind on the market.

WRITE FOR ILLUSTRATED LITERATURE NOW.

Halsey W. Taylor Company
Warren, :: :: :: Ohio

NON-FLUID OIL

Increasing Imitation of

TRADE MARK NON-FLUID OIL REGISTERED IN UNITED STATES PATENT OFFICE

Modern Textile Lubricants

SHOWS THE *INCREASING USE OF NON-FLUID OIL IN TEXTILE MILLS ALL OVER THE COUNTRY.*

Beware of SUBSTITUTES made with PROMISES and a PAINT BRUSH and having little lubricating value.

If you value your machinery—
If you would keep down oil stains—
If you would reduce lubrication cost per month—
If you would reduce labor cost of applying lubricant—

BE SURE TO GET GENUINE NON-FLUID OIL obtained from our branches or direct from our factory. *Our trade mark on every container.*

Just fill out the coupon and mail—it's the quickest way to get the free samples and Bulletin on the Lubrication of Textile Machinery.

New York & New Jersey Lubricant Co.
401 Broadway New York

Southern Agent:
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Ample Stocks at Our Branches
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N. Y. & N. J. Lubricant Co.
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C-9-21

ABSOLUTE OIL CONTROL
IN
OILING TEXTILE MACHINERY

AT LAST an oil can that absolutely controls the oil. A few drops at a time,—no more. Eliminating danger of spoiling the fabric by spilling oil over it.

THE LIDSEEN TEXTILE OILER

NO PUSH bottom to give out, as this oiler is operated by a lever conveniently arranged at top of can. Oil is forced out which keeps the spout free from obstruction.

ANY PERSON can operate this oiler. They can only get a few drops of oil. No waste—no danger—no worry. If can is tipped over it cannot leak.

Ask for further details.

No. 206

LIDSEEN

832-840 So. Central Ave. Chicago, Ill.

Also Mfrs. of LIDSEEN POSITIVE FORCE FEED OILERS

Slidetite
GARAGE DOOR HARDWARE

You'll never hear an owner whose garage doors are equipped with "Slidetite" hangers complain of a damaged car due to accidentally closed doors. It can't happen when "Slidetite" is used. The "Slidetite" folding arrangement, with no obstructing joints on the carriers, gives a free acting, easily operated door which folds up flat against the wall, completely out of the way. A touch of the finger opens or closes the door at will. You should know all about "Slidetite" hardware before installing any other make.

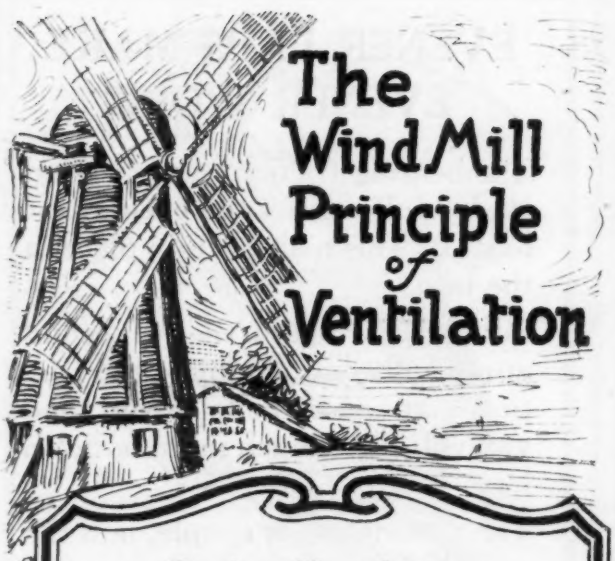
Write Today For Our Catalog G A-22

No other to equal it

"Slidetite" hardware has a host of imitations. They may look like the real thing, but service tells the real story. For equipping one opening with from seven to ten individually operated doors only "Slidetite" will answer the purpose. There is only one "Slidetite."

Hung on "Slidetite" Means they'll work right

Richards-Wilcox Mfg. Co.
A Hanger for any Door that Slides
CHICAGO ST. LOUIS LOS ANGELES PHILADELPHIA AURORA, ILLINOIS, U.S.A. BOSTON NEW YORK CLEVELAND INDIANAPOLIS MINNEAPOLIS LONDON, ONT. SAN FRANCISCO

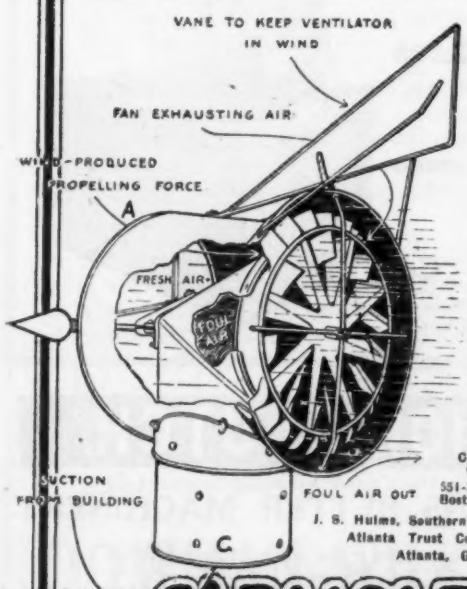


The Wind Mill Principle of Ventilation

Perfect Ventilation With No Expense for Power

THIS patented method of ventilation has proved far more efficient than any other on the market. Tests have shown that the Carlisle displaces from four to six times as much air as ordinary ventilators.

Free air is the power that operates the Carlisle Force Draft Ventilator. The air passing through the funnel comes in contact with the smaller outer blades, thereby propelling the wheel to which the large inner blades are attached. These revolving inner blades create a powerful suction which draws the foul air from below.



A continual supply of pure, fresh air is furnished and maintains the efficiency of your operatives throughout the entire day.

Fewer smaller sized Carlisles will do more work than your present ventilators, and insure positive and CONSTANT ventilation. They are durable, storm proof, trouble-proof. Write for folder.

CARLISLE & GALE CO.
551-577 Albany St.
Boston (18) Mass.

J. S. Hulme, Southern Representative, Atlanta Trust Co., Bldg., Atlanta, Ga.

CARLISLE Force Draft Ventilators

Sanymetal in the factory of the A. O. Smith Corp., Milwaukee, Wis. Herman J. Esser, Arch.

Sanymetal and Armco Iron

UP in Middletown, Ohio, they make an iron that's famous everywhere for its stubborn resistance to rust—Armco Iron. Tried and tested by long service for a thousand purposes, this splendid metal stands out as the one answer to the rust question in a product made of iron. In the manufacture of Sanymetal there is no compromise with quality. Armco Iron and Sanymetal have been inseparable allies. That's why

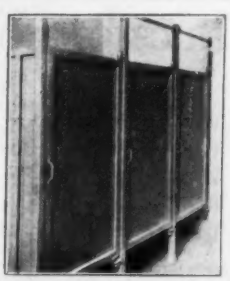
Sanymetal TOILET PARTITIONS TRADE MARK U. S. REG.

—built entirely of Armco, with every base casting and piece of hardware electro zinc plated in addition—have not a square inch about them to rust.

This is another good reason why we can say to you with confidence, that Sanymetal is good for the life of your building.

Sanymetal is the only toilet partition built exclusively of Armco Iron. We'll be glad to tell you the other good things about Sanymetal.

THE Sanymetal PRODUCTS COMPANY
TRADE MARK U.S. REG.
990 East 64th Street - Cleveland, Ohio.



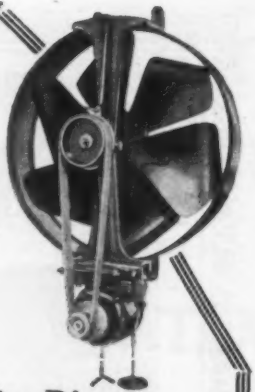
Sanymetal is made for every possible partition need.

SEE CATALOGUE IN SWEETS

A New

Bayley

Product



IN THE FORM OF a light and easily installed disc ventilating fan, made in sizes varying from 20″ to 48″ is hereby introduced to the cotton industry.

The Bayley Junior Disc Fan

has specially shaped floats designed to move a maximum volume of air, with a minimum of power. It is simple in construction, has few moving parts and is equipped with ball bearings throughout.

The Bayley Junior can be furnished for either line shaft drive or with individual motor drive with a speed variation of from 2½% to 100% of maximum speed. This variation is accomplished by a patented belt tension arrangement that permits the use of a standard constant speed motor, thus eliminating the expensive and troublesome variable speed motors used on ordinary variable speed fans.

Write for Bulletin Today.

The Bayley Manufacturing Company

Dept. I

MILWAUKEE, WIS.

EVENER LAPS MAKE EVENER WORK

The bearing friction of apron and evener rolls causes the evener belt to slip. This makes a thin place in the lap.

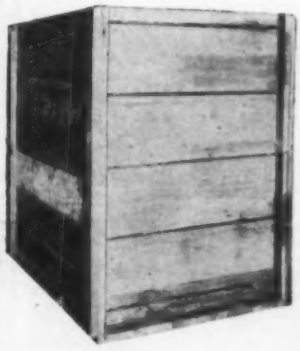
Put ball bearings on the evener and apron rolls and eliminate the friction that causes belts to slip, and you will get a much more uniform lap.

The installation is simple, and the cost slight.

AldricH MachinE

Ball **WorkS** Bearings

Greenwood, S. C.



Cypress Tanks
Wooden Packing Cases
ALL STYLES

Manufactured from

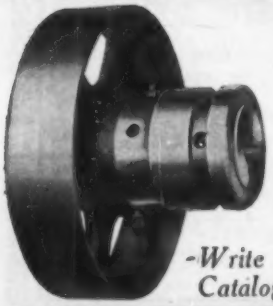
GEORGIA PINE POPLAR CYPRESS
WHITE PINE and GUM

Your Inquiry Solicited

Hightower Box & Tank Co.

Corner Humphreys and Glenn Streets,
BOX 1025 ATLANTA, GA.

THE JOHNSON FRICTION CLUTCH



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FRICTION CONTROL MEANS BETTER MACHINERY

And we specialize in applying the proper type of friction clutch to meet any conditions.

In the textile plant, the highest efficiency in power transmission lies in the group drive from lineshaft with Johnson Clutch Control. Eliminate your inefficient countershafts and expensive individual motors.

Adopt the Johnson Lineshaft Drive

Johnson Clutches are available from stock in standard sizes, single and double, to fit all shaft and pulley dimensions.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

You---

textile men who want **good printing** without the high prices will be surprised at the reasonable charges we can make you considering the high quality of work and the pleasing service we offer you.

Whatever the printing you require, be it time cards, time sheets, rate sheets, letterheads, bill heads, special forms, or attractive booklets, blank books, etc., **Dowman-Wilkins** service and price will please you.

We have just moved into our new plant in the center of the new business district of Atlanta, and our long experience combined with our new and up-to-date plant and equipment enables us to solicit your business with the knowledge that the satisfaction you will secure will make you one of our regular customers.

Let us estimate on your next job.

DOWMAN-WILKINS PRINTING COMPANY

107-109 Luckie St., ATLANTA, GA.

Pioneer with the Pioneer

—and be the first to reach the goal

The textile industry, as a whole, has been among the first to emerge from the passing era of business depression. Trade conditions, together with efficient engineering and management, have all contributed to this condition.

Now, new problems of management must be solved. New operating conditions must be met. New standards of production must be established to meet new methods of merchandising.

And under these new conditions Lockwood-Greene experience and Lockwood-Greene service assume a new importance.

Lockwood, Greene & Co. have been meeting "new" conditions for nearly ninety years. They are meeting new conditions today.

Questions of finance, questions of management, questions of production, business problems, building problems, engineering problems—all are being met, solved, and answered.

Lockwood-Greene service is a flexible thing ready to be applied to many calls, differing widely in their requirements.

BUILDING WITH FORESIGHT

In meeting and solving the problems of today—and tomorrow, the experience and service of Lockwood, Greene & Co. are at *your* call.

Take advantage of them. Pioneer with the pioneer—and be the first to reach the goal.

LOCKWOOD, GREENE & CO.

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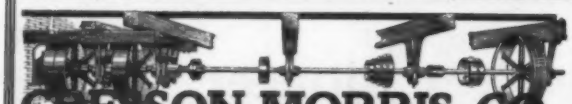

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POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also proceed merit as surely in machinery as in men.

Time, skill and effort must also proceed merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

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PHILADELPHIA, PENNA.

Branch Office, 141 Milk St., Boston, Mass.

20

Diamond·F

Condensite Celoron Silent Gears

Every industry may now have silent gears —gears that are water, oil and greaseproof—self-supporting, vulcanized fibre gears that require no shrouds or end plates—tough, strong, waterproof vulcanized fibre gears that will give service in places and under conditions where the average silent gear could not survive.

Condensite Celoron gears will stand up and give service under the most trying conditions because they are almost as strong as cast iron and far more resilient. Equal to sudden shock or heavy strain. They save money, too, because they save power, make a more quiet plant, better working conditions, more contented workmen and speed up production generally.

Most all good gear cutters can supply you with Condensite Celoron gears or pinions. Or, we will gladly send you the names of gear cutters in your neighborhood who will be glad to help you. Write us today.

Diamond State Fibre Company

Bridgeport (near Philadelphia), Pa.

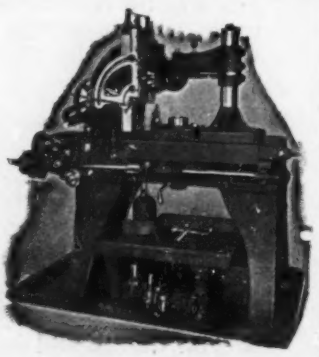
Full Automatic, Semi-Automatic and Hand Operated

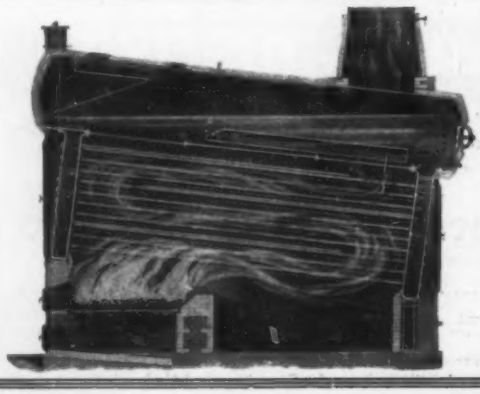
Gear Cutting Machines

Especially adapted for use in Cotton Mills Hundreds now in use. Send for Special Circulars.

The D. E. Whiton Machine Co.,

NEW LONDON, CONN.





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Our IMPROVED STEEL CASINGS fitted to your Boilers will save you from 10% to 25% in fuel.

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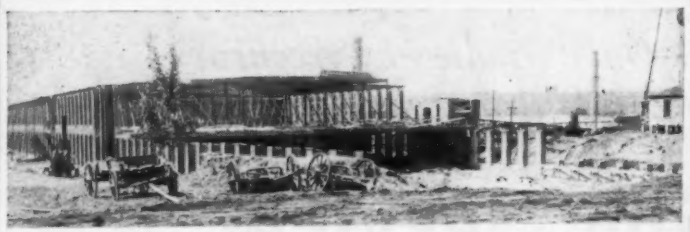

Reinforced SLAG concrete buildings erected for Osprey Mills at Porterdale, Ga., by Algernon Blair, Contractor, of Montgomery. The mastic floors and built-up slag roofs were laid by C. P. Murphy's Sons of Atlanta.

--It's fire-proof
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SLAG Concrete is Practically Everlasting

Leading architects have shown their faith in Basic Slag by using it almost exclusively, in the construction of the South's newest and most modern Cotton Mills.

Here's why. Basic Slag in concrete reduces the dead load from 15% to 30%—develops a higher tensile and compressive strength than stone or gravel, is fire resisting, repair free and practically everlasting. Your architect will substantiate these statements. Ask him.

Architects know they will get both when they use

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

as the "coarse aggregate" for your weave sheds and mill buildings of reinforced concrete.

Birmingham Slag Co.
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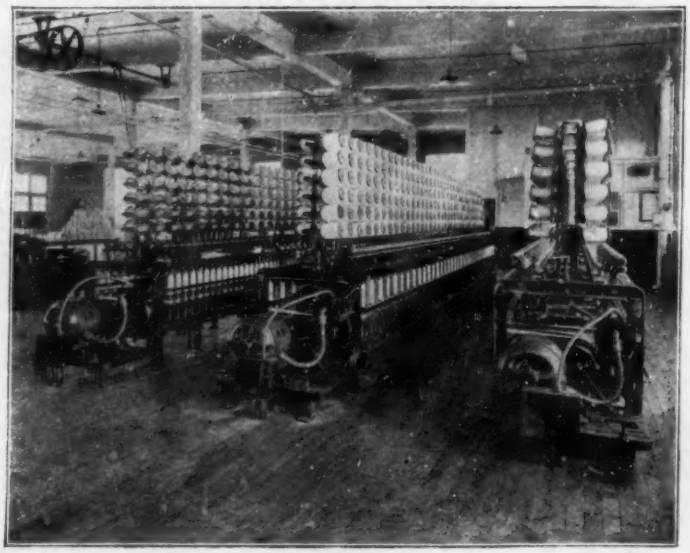

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Allis-Chalmers Motors driving Twisters in large Southern Cotton Mill.

Allis-Chalmers Equipment in the Textile Industry consists of complete Electrical Power Equipment, Transmission Machinery, Power Generating Apparatus, Steam Turbines, Hydraulic Turbines, Steam Engines, Gas Engines and Oil Engines.

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MILWAUKEE, WIS. U. S. A.

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Each Would Be Useless Without the Other

Unfailing Service

In the struggle and stress of modern business life every moment of delay represents a loss of time and money which cannot be regained.

When promptness, accuracy and dispatch are the vital elements in the delivery of electric equipment or supplies it is natural to turn to the Carter Electric Company for service.

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If your requirements cover Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Lamps or other electric supplies, it is only a matter of a few hours before we can place them in your hands.

This is because our warehouses are always fully stocked—everything you may need and in large quantities—and with every modern facility for handling your business the Carter Electric Company pledges you **Unfailing Service.**

Carter Electric Company

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Don't Discard Your Broken Parts
LET US RENEW THEM

There is no need of discarding broken machines and machine parts. There is no need of waiting an indefinite length of time for delivery of new parts.

Experience has taught many mills that they can obtain prompt and efficient welding service through the Standard Gas Products Company.

No matter how bad the break, it can be made as good as new by the use of "Standard" Welding Service. No need to ship machine. We come to you. Our experts are at your service ready to assist you in every way possible. Our long experience in welding is assurance that our work will make the machine broken as good as new. Write for full data, today.

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Oxygen, Oxy-Acetylene Welding and Cutting Machines and Supplies.

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QUICK WELDING SERVICE

Welding a cylinder, 2090 lbs. and cylinder head 3 inches thick weld 20 inches—for Block Coal Co., Block, Tenn.

DON'T DISCARD YOUR BROKEN PARTS OUR SERVICE SAVES TIME AND MONEY

There is no need of discarding broken machines and machine parts—there is no need of shutting down and waiting an indefinite length of time for delivery of new parts.

Many mills know through experience that should a machine breakdown occur, it can be put back in operation quickly by calling on AUTOGENOUS.

We have just completed the repair on the crosshead and main bearing of a 1200 H.P. engine for the Brookside Cotton Mills. Practically every cotton and knitting mill in the vicinity of Knoxville has taken advantage of and profited by AUTOGENOUS Welding Service. Many of these jobs were extra large and caused a shutdown of the plant, and much time was saved by our quick service.

No matter how bad the break, no matter how small or large the machine or part, AUTOGENOUS Welding Service can save you money.

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The Recognized Standards of Quality
COTTON YARNS

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Flint Manufacturing Co.
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Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness, and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

30s to 80s Single and Ply Combed Peeler Right Twist. 30's to 50's Single and Ply Double Carded Peeler, Right or Reverse Twist.

20s to 60s, 2, 3, and 4 Ply, Combed Peeler, Reverse Twist.

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LINEN YARNS

For Weaving, Knitting and all Purposes.

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And Every Description of Linen Thread and Twine

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You need The Citizens & Southern

Capital and Surplus $4,500,000

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Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the South make it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

"No account too large, none too small"

ESTABLISHED 1872

H. & B. BEER

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HENRY BEER EDGAR H. BRIGHT

J. WILLIAM BARKDULL C. MORGAN ABRAMS

MEMBERS OF

New Orleans Cotton Exchange
New Orleans Future Brokers Association
New York Stock Exchange
New York Cotton Exchange
New York Coffee Exchange
New York Produce Exchange
Chicago Board of Trade

Associate Members of the Liverpool Cotton Association

Private Wires to Principal Points

The American Audit Co.

F. W. LAFRENTZ, C. P. A., Pres. Telephone Ivy 869
H. M. RICE, C. P. A., Vice-Pres. Cable Address
A. F. LAFRENTZ, Secy. & Treas. Amdit, New York

NEW YORK—100 Broadway (Home Office).
33rd St. and 5th Ave., Waldorf-Astoria.
ATLANTA BRANCH—1013-1017 4th National Bank Bldg.
CHICAGO—Marquette Building.
BOSTON—P. O. Square Bldg.
PHILADELPHIA—Bellevue Court Bldg.
BALTIMORE—Garrett Bldg.
WASHINGTON, D. C.—Colorado Building.
NEW ORLEANS—Maison Blanche.
RICHMOND, VA.—American National Bank Building.
LONDON, E. C.—50 Gresham St., Bank.
MILWAUKEE—Loan & Trust Bldg.
SCRANTON—County Bank Bldg.
Specialists in Cost Systems and Manufacturing Accounts.

C. B. BIDWELL, P. A., Resident Vice-President

CARVER-BEAVER YARN CO.

Successors to A. D. SALKELD & BRO., Inc.

ALL NUMBERS COTTON MERINO **YARNS** ALL COLORS WOOL WORSTED

366 BROADWAY, NEW YORK

ADVERTISING is an economy and cuts the cost of selling, making lower prices or better goods possible without sacrifice of the sellers' profits.

HUNTER

Manufacturing and Commission Co.

58-60 Worth Street **New York City**

World-Wide Distributor of Cotton Fabrics

Selling Agents for

Southern Cotton Mills

Fabrics for Home and Export

Domestic Branch Offices

Boston Chicago San Francisco Philadelphia
Baltimore St. Louis Greensboro
Cleveland Kansas City

Foreign Branch Offices

Buenos Aires, Argentina
Santiago, Chile
Baranquilla, Colombia
San Juan, Porto Rico
Curacao, D. W. I.
Havana, Cuba
Caracas, Venezuela
Manilla, P. I.

1865 Oldest National Bank in the Cotton States 1921

The Atlanta National Bank

Statement of Condition September 6, 1921

OFFICERS
ROBERT F. MADDOX
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VICE PRESIDENTS
James S. Floyd
Geo. R. Donovan
Thos. J. Peeples
ASSISTANT CASHIERS
D. B. DeSaussure
R. B. Cunningham
Jas. F. Alexander
Leo Stillman
A. N. Anderson
J. S. KENNEDY, Cashier
DIRECTORS
W. L. Peel
E. F. Maddox
Albert E. Thornton
E. H. Inman
J. J. Spalding
Alfred Austell
S. C. Dobbs
Jas. L. Dickey
J. S. Floyd
Geo. R. Donovan
J. T. Holleman
Lloyd B. Parks
J. Epps Brown
Dr. W. S. Elkin
Wm. J. Davis
H. R. Durand
S. Y. Tupper

RESOURCES

Loans and Discounts	$17,584,821.76
United States Bonds	1,021,460.00
Other Bonds and Stocks	57,997.90
Stock in Federal Reserve Bank	75,0..
Banking House	800,000.00
Cash on Hand, Due from Banks and United States Treasurer	4,214,530.07
	$23,753,809.73

LIABILITIES

Capital Stock	$ 1,000,000.00
Surplus and Undivided Profits	2,210,309.05
Circulation	976,800.00
Rediscounts	1,405,000.00
DEPOSITS	18,161,700.68
	$23,753,809.73

The Atlanta National Bank

Active Designated Depositary of The United States of America
State of Georgia, City of Atlanta and County of Fulton

Hotel Sinton

the hotel of character
in the city of character

CINCINNATI

Not merely the finest hotel in Cincinnati, but one of the best in the entire Middle West.

Nationally famous for its delicious foods and courteous service. The stopping place of every nationally or internationally famous personage visiting Cincinnati.

Three separate dining rooms: large French Ball Room; Servidor Service throughout. Recent addition make capacity 700 rooms, each with private bath.

Moderate Tariffs

Write for booklet on Cincinnati and the Hotel Sinton. We will also send Mail Order price list of the famous Hotel Sinton Louis XVI Candies.

Hotel Sinton Management of John L. Horgan **Cincinnati**

NATIONAL BANK OF COMMERCE 1839 IN NEW YORK

Foundation of Credit

Common knowledge regarding a firm's credit standing not only is beneficial to the firm but constitutes the foundation of the entire structure of credit.

The vast credit operations of the National Bank of Commerce in New York are safeguarded by virtue of a highly organized research of those conditions and facts which justify or limit credit.

The benefit of our extensive credit experience is shared with our friends.

National Bank of Commerce in New York

Capital, Surplus and Undivided Profits
Over Fifty-five Million Dollars

J. SPENCER TURNER CO.

56 WORTH STREET, NEW YORK

COTTON DUCK

ARMY—SAIL—WIDE

"LOWELL" TIRE FABRICS-SPECIAL DUCK

CRASHES—TWILLS—DRILLS—SATTEENS

ROPE—TWINE

COTTON YARNS

ESPECIAL ATTENTION GIVEN TO EXPORT REQUIREMENTS

CHICAGO
208 So. LaSalle St.

PHILADELPHIA
M. & M. Building

BOSTON
161 Devonshire Street

HAMILTON, CANADA
J. Spencer Turner Co. of Canada, Limited

J. H. LANE & CO.

334 Fourth Avenue

NEW YORK

Selling Agents for
Cotton Mill Products

BOSTON CHICAGO

BLISS, FABYAN & CO.

NEW YORK BOSTON CHICAGO

Selling Agents for

Androscoggin Mills	Hill Manufacturing Co.
Bates Mfg. Co.	Otis Company
Boston Duck Co.	Palmer Mill
Columbian Mfg. Co.	Pepperell Mfg. Co.
Cordis Mills.	Thorndike Company
Edwards Mfg. Co.	Warren Cotton Mills.

Otis Company—Underwear

THE MARTINIQUE

(Affiliated with Hotel McAlpin)

Broadway, 32nd and 33rd Streets

NEW YORK CITY

SITUATED IN CENTRE OF SHOPPING DISTRICT—Adjacent to Theatre Section

Entrance from Hotel to New York Subway and Hudson Tubes affording direct communication with the Pennsylvania and Grand Central Stations, also general Post Office and Railroad Stations at Jersey City.

The Restaurants offer a truly McAlpin Service—with Club Breakfasts, Special Luncheons and Dinners, also a la Carte Service—All at moderate prices.

600 ROOMS

PLEASANT ROOMS FROM $2.50 UP.

FRANK E. JAGO—Resident Manager

HOTEL TULLER

DETROIT, MICH.

600 Rooms **600 Baths**

$2.50 up, Single **$4.50 up, Double**

Agents Sample Rooms $5.00 per day

HEADQUARTERS IN DETROIT FOR

Old Colony Club

Detroit Automobile Club

Motion Picture Exhibitors' Assn.

Detroit Transportation Club

Table d'Hote Dinner $1.50 and $1.75

Business Men's Lunch .75.

Cafe A La Carte **Cafeteria** **Men's Grille**

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CONSTRUCTION

American Roofing & Paint Co., Inc.

Dealers in

PAINTS, VARNISHES, STAINS,
ROOFING, ROOFING MATERIALS

Roofing Contractors——::——Painting Contractors
Office, 246 Decatur St. P. O. Box 1065
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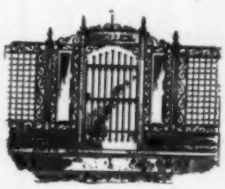
SYDNOR'S SUPREME SERVICE

WELL DRILLING
and DEEP WELL PUMPS

We do the engineering and have been solving water problems satisfactorily for 25 years for textile mills.

Sydnor Pump & Well Co., Inc., Richmond, Va.



WIRE RAILINGS
WINDOW GUARDS
WIRE CLOTH
Established 1835.
DUFUR & CO.
309 N. Howard St., Baltimore, Md.

GOODE CONSTRUCTION COMPANY

GENERAL CONTRACTORS

Charlotte, N. C.

FUEL & POWER SUPPLIES

BRYAN ELECTRIC COMPANY

58 Edgewood Avenue, Atlanta, Ga.

Electric Light, Power, Telephone and Bell Wiring for Residences, Stores and Factories. Estimates Furnished.

REWINDING FOR MOTORS, GENERATORS

All kinds of new and used Electrical Machinery bought, sold and exchanged.

All Kinds of Electrical Work—Motors Rented.

Telephone your wants. Local and Long Distance, Ivy 1788-1790.

Coal Is Now Moving

Place your order now for our KENTUCKY VELVET LUMP and there will be warmth and good cheer in your home.
Ask some coal expert about this analysis.

Volatile matter	.38	Moisture	1.22
Fixed Carbon	.60	Sulphur	.32
Ash	1.10	B. T. U.'s	14948

We handle the Empire, one of the best mines in Alabama. Also steam and mine run coal from Kentucky and Tennessee.

Truitt Coal and Iron Company
ATLANTA, GEORGIA

Advertising conserves the Manufacturer's time by acquainting him with a service or product at his leisure long before the need for such arises.

CLASSIFIED ADVERTISING

TRAVELING SALESMAN WANTED to handle a well known line of aniline colors and chemicals, covering the states of Kentucky, Tennessee and West Virginia. Also would consider another to cover Alabama, Mississippi and Louisiana. Good, liberal commission enabling right man to earn splendid salary. Write full information, confidentially, regarding yourself. Needham H. Benefield, 1111 North Main St., Danville, Va.

WANTED

4 roller top cards for short fibre cotton. Must be good condition. Give make, description and price. Address: Box 510, Columbia, S. C.

Do You Want to Sell It?

Probably you, like many other mills, have some equipment or machinery which you have taken out, or are thinking of taking out and replacing with new equipment.

Why not dispose of this second-hand equipment at a profit? COTTON is read by thousands of Cotton Mills that are hardly touched by Northern journals.

You Can Sell Your Second-Hand Equipment

to these mills through advertising in the Classified Advertising Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have for sale and let us insert an advertisement for you.

COTTON

Grant Bldg., Atlanta, Ga.

RATES:

DISPLAYED.

"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

Rates for larger spaces furnished on application.

WITHOUT DISPLAY.

"Positions Wanted" 2 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

"Positions Open" and other undisplayed advertisements, 4 cents per word per insertion. Minimum charge $1.00. Payable in advance.

(When replies are to be received in our care, allow four words for box address.)

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,

127-31 N. Third St.

Philadelphia, - Pennsylvania

ACCELERATED SCHEDULES DOUBLE TRACK REGULARITY

Between the South and Washington and New York

Northbound				SCHEDULES BEGINNING AUGUST 14, 1921		Southbound			
No. 36	No. 138	No. 38	No. 30			No. 29	No. 37	No. 137	No. 35
12.00Night	11.30AM	12.30noon			ATLANTA, GA.		5.50PM	4.50PM	5.25AM
12.10AM	11.40AM	12.40PM	4.00PM	lv	Terminal Station (Cent. Time) ar		5.30PM	4.30PM	5.05AM
6.15AM	4.50PM	5.50PM	9.35PM	lv	Peachtree Station (Cent. Time) ar	10.55AM	5.30PM	4.30PM	5.05AM
7.35AM	5.55PM	6.55PM	10.40PM	ar	GREENVILLE, S. C. (East. Time) lv	7.00AM	2.10PM	1.00PM	1.05AM
10.05AM	8.05PM	9.05PM	12.55AM	ar	SPARTANBURG, S. C. lv	5.50AM	1.00PM	11.52AM	11.45PM
11.45AM	9.20PM	10.20PM	2.20AM	ar	CHARLOTTE, N. C. lv	3.28AM	10.40AM	9.30AM	9.05PM
1.05PM	10.29PM	11.20PM	3.23AM	ar	SALISBURY, N. C. lv	2.05AM	9.20AM	8.10AM	7.45PM
1.30PM	10.50PM	11.41PM	5.44AM	ar	High Point, N. C. lv	12.45AM	8.02AM	7.02AM	6.27PM
2.40PM	9.00AM	9.00AM	9.00AM	ar	GREENSBORO, N. C. lv	12.15AM	7.35AM	6.35AM	5.58PM
3.35PM	4.00AM	4.00AM	10.45AM	ar	Winston-Salem, N. C. lv	8.50PM	5.30AM	5.30AM	3.05PM
2.50PM	12.06AM	1.00AM	5.04AM	ar	Raleigh, N. C. lv	7.00PM	12.40AM	12.40AM	8.52AM
	9.00AM		4.30PM	ar	DANVILLE, VA. lv	10.52PM	6.10AM	5.05AM	4.15PM
9.35PM	7.10AM	7.10AM	1.40PM	ar	Norfolk, Va. lv	7.35AM	6.30PM	6.30PM	
5.17PM	2.16AM	3.16AM	7.06AM	ar	Richmond, Va. lv	3.45PM	11.00PM	11.00PM	7.45AM
11.00PM	7.40AM	8.40AM	12.35PM	ar	LYNCHBURG, VA. lv	9.00PM	4.15AM	3.05AM	2.25PM
1.50AM	9.05AM	10.05AM	2.00PM	ar	WASHINGTON, D. C. lv	3.30PM	10.55PM	9.50PM	9.00AM
4.15AM	11.13AM	12.20PM	4.05PM	ar	BALTIMORE, MD., Penna. Sys. lv	1.53PM	9.30PM	8.12PM	6.05AM
4.35AM	11.24AM	12.35PM	4.17PM	ar	West PHILADELPHIA lv	11.38AM	7.14PM	5.47PM	3.20AM
6.45AM	1.30PM	2.40PM	6.10PM	ar	North PHILADELPHIA lv	11.24AM	7.02PM	5.35PM	3.04AM
					NEW YORK, Penna. System lv	9.15AM	5.05PM	3.35PM	12.30Night

EQUIPMENT

Nos. 37 and 38. NEW YORK & NEW ORLEANS LIMITED. Solid Pullman train. Drawing room stateroom sleeping cars between New Orleans, Montgomery, Atlanta, Washington and New York. Sleeping car northbound between Atlanta and Richmond. Dining car. Club car. Library-Observation car. No coaches.

Nos. 137 & 138. ATLANTA SPECIAL. Drawing room sleeping cars between Macon, Columbus, Atlanta, Washington and New York. Washington-San Francisco tourist sleeping car southbound. Dining car. Coaches.

Nos. 29 & 30. BIRMINGHAM SPECIAL. Drawing room sleeping cars between Birmingham, Atlanta, Washington and New York. San Francisco-Washington tourist sleeping car northbound. Sleeping car between Richmond and Atlanta southbound. Observation car. Dining car. Coaches.

Nos. 35 & 36. NEW YORK, WASHINGTON, ATLANTA & NEW ORLEANS EXPRESS. Drawing room sleeping cars between New Orleans, Montgomery, Birmingham, Atlanta and Washington and New York. Dining car. Coaches.

Note: Nos. 29 and 30 use Peachtree Street Station only at Atlanta.

Note: Train No. 136 connects at Washington with "COLONIAL EXPRESS," through train to Boston via Hell Gate Bridge Route, leaving Washington 8.15 A. M. via Penna. System.

SOUTHERN RAILWAY SYSTEM

The Double Tracked Trunk Line Between Atlanta, Ga. and Washington, D. C.

BUY IT AT OLD HICKORY

Where the Surplus Stocks of Machinery from the Government's $87,000,000 Project Are Being Sold at Surprisingly Low Prices

Sterling Boilers

44—823 H.P. Sterling Boilers, Class M-80, complete with all accessories. Babcock & Wilcox Co., New York, makers. 200 lbs. pressure, 630 3½-inch tubes, No. 10 gauge. 150 of these tubes are circulators. Steam drums double riveted, double strap butt joint, 1-inch rivets. Thickness shell plates and tube sheets in steam drum ⅞ inch, mud drum 1 inch. Space occupied by boiler 18 feet by 22 feet 3 inches by 29 feet 9 inches high.

Stokers—4-8 Retort, double dump underfeed stokers, with line shafting, etc., manufactured by Westinghouse Electric Co., Stoker Extension hoppers.

Stoker Engines—8 x 8 Buffalo Forge Co., Vertical Engines, single acting, inclosed, Class A, rated at 32 H.P., 350 R.P.M., equipped with 1-2½ governor, 1--2½ throttle valve, Jenkins Valve Co. Stoker Drive 17 x 20 x 3, silent Morse chain.

Fan and Turbine—1 Turbo-Conoidal Fan, Buffalo Force Co., Type T-D No. 9½ double inlet, 100,000 cu. ft. per minute at 6" water pressure and 970 R.P.M., driven by 225 H.P. horizontal, multi-stage, non-condensing Moore Turbine and reduction gear. throttle valve 3". Steam Consumption at 180 H.P. 31-6 lbs. at 225 H.P. 33-2 lbs. Turbine and reduction gear. Manufactured by Moore Steam Turbine Co., Wellsville.

Accessories for Each Boiler.

1—12" Ashcroft, 400 lb. steam gauge.
4—4½" Consolidated safety pop valves.
1—3" Pratt & Gady Feed valve.
2—2½" Elliott blow-off valves.
1—8" Foster non-return valve.
1—6" Vulcan soot blower.
1—Bailey flow meter, rated flow 28,000 lbs. hr., max. flow 70,000 lbs. per hour.

These boilers have been tested under steam pressure but never operated.

Pumps

Motor Driven Centrifugal.

10—14-in. Worthington, Class B, double suction, 8,600 G.P.M. at 152 feet head, at 1.170 R.P.M. direct connected to 300 H.P. General Electric, 3 phase, 60 cycle, 2300 volt, 1700 R.P.M. motors.

4—14-in. Allis-Chalmers, Type S, 7500 G.P.M. at 130 feet head. at 1760 R.P.M. direct connected to 150 H.P. General Electric, 3 phase, 60 cycle, 2300 volt motors.

2—10-in. Allis-Chalmers, Type S, 3750 G.P.M. 130 feet head direct connected to 100 H.P. General Electric, 3 phase, 60 cycle, 2300 volt motors.

3—6-in. A.W.W., 1000 G.P.M. 125 lbs. pressure, direct connected to 150 H.P. Westinghouse, 3 phase, 60 cycle, 2300 volt, 1765 R.P.M. motor.

Steam Turbine Driven Centrifugal.

6—16-in. Allis-Chalmers, Type S, 8500 G.P.M. at 90 feet head, direct connected to Type L, 300 H.P., 2000 R.P.M. steam turbine.

6—14-in. Allis-Chalmers, Type S, 6500 G.P.M. at 150 feet head, 8100G.P.M. at 90 feet head, direct connected to 300 H.P. 2000 R.P.M. steam turbine

Steam Actuated Hydraulic.

6—14 and 20 x 7½ x 18 Worthington Compound Duplex outside and pocket plunger, 400 G.P.M. at 300 lbs. pressure.

10—25 and 38 x 4⅝ x 24 Worthington Tandem Compound Duplex, outside end pocket, 3600 lbs. pressure, 150 G.P.M. at 20 R.P.M.

2—20 x 12 x 16 Worthington Duplex Underwriter Fire Pumps, 1500 G.P.M., 100 lbs. pressure.

200—New and used boiler feed Worthington Pumps, 3 x 2 x 3, 4½ x 2¾ x 5, 5½ x 3½ x 5, 6 x 4 x 6, 12 x 7 x 10.

Corliss Engines

27—18 x 36 Heavy Duty, Allis-Chalmers Corliss Engines, both right and left hand, 125 R.P.M., 350 H.P. 11 ft. x 32 in. Band Wheel, operated on 140 lbs. steam, 1½-in. gauge back pressure double eccentric.

Engines have been used ten days to three months and are practically new.

Transformers

6—600 K.V.A. Westinghouse Transformers (40° C.), outdoor type, 60 cycle, single phase, 600-1200-2400 volt primary, 6300 volt secondary. Complete with oil. Transformers arranged with taps for starting 300 H.P., 2200 volt, 3 phase motors. Transformers on new AIEE rating at 550° C., 750 K.V.A.

27—250 K.V.A. Westinghouse Outdoor Type Transformers, 2300-460 volt, 60 cycle, single phase, Spec. No. 159463-A.

18—250 K.V.A. Allis-Chalmers Outdoor Type Transformers, 2300-230-440 volt, 60 cycle, single phase.

3—100 K.V.A. Westinghouse S.K. Transformers, outdoor type, 6600 volt, 2200-2000, 60 cycle, single phase.

500-H. P. Keeler Boilers

5—500 H.P. Keeler Water Tube Boilers, 160 lb. pressure, Wetzel stokers. Three new, two used 60 days. Immediate delivery. At a bargain.

Steel Tanks

4000 Steel Tanks, all sizes and shapes. 9 x 36, 8 x 36, 9 x 30 Storage Tanks. Weight tanks, with scales. Round storage tanks, with cover of every size. Small Tanks of every size.

Pipe and Pipe Covering

200 Miles of Practically New Pipe.

26,000 ft. 16 in.	6,930 ft. 7 in.
17,300 ft. 14 in.	37,920 ft. 6 in.
9,800 ft. 12. in.	13,870 ft. 5 in.
12,870 ft. 10 in.	21,600 ft. 4 in.
18,335 ft. 8 in.	68,400 ft. 3 in.

Thousands of feet 2½ in. and smaller. Thousands of feet of hydraulic pipe of all weights.

All of this pipe has been above ground, covered and a great deal has never been used, though installed. Can deliver promptly. Will be sold on a tonnage basis.

Thousands of feet of serviceable 85% Magnesia Covering and lagging, all sizes. Large quantity of all sizes cork covering and fittings.

Relaying Rail

600 tons 80 lb. A S C E Section.
1600 tons 67½ Russian Section.
100 tons 25 lb. section.
176 15 ft. Sections, 12 lb. portable track with switches.
Switches, frogs, crossings, Ellis bumping posts.
Track material of all kinds.

Motors

Single Phase, 60 Cycle.

No.	H.P.	Volts
4	⅛	110
1	¼	110
1	¼	110
5	½	110

Three Phase, 60 Cycle.

No.	H.P.	Volts
11	½	440
2	1	440
3	1½	440
1	1¾	220
20	2	440
5	3	220
13	3	440
1	5	220
39	5	440
3	7½	220
255	7½	440
5	10	440
90	10	440
115	15	440
6	20	440
20	25	440
33	30	440
28	40	440
7	50	440
5	75	440
1	100	440
1	150	2200
2	300	2200

The above motors are standard makes, of various types and speeds.

Send us your specifications; we can fill them.

Belting

Thousands of feet of new Condor and Anaconda Belting in lengths ranging from 100 to 500 ft. In practically all widths and from 2 to 10 ply. Write for Bulletin No. 5.

Plant Sites

Complete factories and plant sites, in the heart of the Central South are now available at extremely low terms. Write our Industrial Department for information.

THE NASHVILLE INDUSTRIAL CORPORATION

JACKSONVILLE, TENN.

Buyers' Index

Acetylene Welding Apparatus.
(See Welding Apparatus).

Acetylene Gas.
Commercial Acetylene Supply Co.
Standard Gas Products Co.

Accountants.
(See Auditors and Accountants).

Adding Machines.
Monroe Calculating Mch. Co.

Air Brakes.
Allis-Chalmers Mfg. Co.

Air Washers.
Bayley Mfg. Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlorine.
(See Dyestuffs and Chemicals).

Aprons-Rub.
Smith & Furbush Machine Co.

Architects and Engineers.
Lockwood, Greene & Co.
Robert & Co.
Spiker & Lose.
Sirrine, J. E.
Tufts Co., Arthur.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Campbell Mfg. Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co
S K F Industries.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.

Ball Bearing Top Rolls.
Campbell Mfg. Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale and Box Ties.
Signode System, Inc.

Baling Machines.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Famous Mfg. Co.
Galland-Henning Mfg. Co.
Williams & Sons, I. B.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banding Straps and Buckles.
Signode System, Inc.

Bands (Self-Tying).
Campbell Mfg. Co.

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Atlanta National Bank.
Citizens & Southern Bank.
National Bank of Commerce In New York.
National Shawmut Bank.
Textile Banking Co.

Barometers (Mercurial).
Taylor Instrument Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Crane Co.
Manufacturing Equipment & Engineering Co.
Sanymetal Products Co.

Batteries (Elec.).
(See Storage Batteries).

Beams.
Mossberg Pressed Steel Corp.
Vermont Spool & Bobbin Co.
Walraven Co.

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beam Heads.
Mossberg Pressed Steel Corp.
Walraven Co.

Beaming and Warping Mchry.
(See Warpers and Warping Machinery).

Bearings.
Cresson-Morris Co.
Diamond State Fibre Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
S K F Industries.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Wood's Sons Co., T. B.

Belting.
American Supply Co.
Augusta Mill Supply Co.
Fabreck Belting Co.
Walraven Co.
Williams & Co., I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission)

Belt Conveyors.
Link-Belt Company.
Morse Chain Co.

Belt Dressing.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Columbus Novelty Mfg. Co.
Flexible Steel Lacing Co.

Belt Lacing.
Augusta Mill Supply Co.
Fabreeka Belting Co.
Columbus Novelty Mfg. Co.
Flexible Steel Lacing Co.
Walraven Co.

Belt Tighteners.
Link-Belt Company.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

Bench Drawers.
Lupton's Sons. Co., David

Bench Legs (Pressed Steel).
Lupton's Sons. Co., David.

Benches (Park and Playground).
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Bleacheries.
(See Dyers, Bleachers and Finishers).

Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
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Bleaching, Finishing and Sizing Materials.
(See Finishing Materials).

Blowers and Blower Systems.
Bayley Mfg. Co
Bryan Electric Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
Clements Mfg. Co.
General Electric Co.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Bobbins.
Atkinson Haserick & Co.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
Vermont Spool & Bobbin Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
American Water Softener Co.
Norwood Engineering Co.
Permutit Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
International Engineering Co.
Lunkenheimer Co.
Nashville Industrial Corp.
Sturtevant Co., B. F.

Boiler Grates and Stokers.
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Bookkeeping Machines.
Monroe Calculating Mch. Co.

Box Strapping and Tie Buckles.
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Boxes—Mill.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Lane & Bros., W. T.
Standard Fibre Co.

Boxes—Packing.
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Boxes (Steel).
Lyon Metallic Mfg. Co.

Braid.
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Brake Linings.
Diamond State Fibre Co.

Brazing.
(See Welding).

Brokers—Cotton.
(See Cotton Dealers & Brokers).

Brokers—Stock.
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Brooms.
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Brushes—Mill.
Atlanta Brush Co.
Harris Broom Co.
Southern Brush & Broom Co.
Southwestern Broom Mfg. Co.

Brushes—Commutator.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets and Pails—Mill.
Diamond State Fibre Co
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
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Building Contractors.
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Buildings—Portable.
Seawell, Luke.

Building Material.
American Roofing & Paint Co.
Atlantic Drier & Varnish Co.
Barrett Co., The.
Birmingham Slag Co.
Carlisle & Gale Co.
Dowman, Geo.
Dufur & Co.
Lockwood, Green & Co.
Lupton's Sons Co., David
Sanymetal Products Co.
Seawell, Luke.
Southern Cypress Mfg. Asso.

Bungalows.
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Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Diamond State Fibre Co.
Southern Spindle & Flyer Co.
Shambow Shuttle Co.
Walraven Co.

Cabinets.
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Calculating Machines.
Monroe Calculating Mch. Co.

Calenders.
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Textile Finishing Machinery Co.

Calender Rolls.
Campbell Mfg. Co.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Bryan Electric Co.
Carter Electric Co.

Cans—Roving.
Diamond State Fibre Co.
Standard Fibre Co.

Canvas Lugs.
Augusta Mill Supply Co.

Cars and Trucks—Fibre.
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Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Salem Iron Wks.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Mch. Wks.

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Atkinson Haserick & Co.
Howard Bros. Mfg. Co.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co
Whitin Machine Works.

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Southern Spindle & Flyer Co.
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Textile Finishing Machinery Co., The.

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Casement Window Hardware.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

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Cresson-Morris Co.
Lombard Foundry & Mch. Co.
Walsh & Weidner Boiler Co.

Caustic Soda.
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Cement Reinforcement.
Birmingham Slag Co.

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Du Pont de Nemours & Co., E. I.
Patterson-Sargent Co.
Wadsworth Howland & Co., Inc.

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Georgia Railway & Power Co.

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Cresson-Morris Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

Chain Drives.
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Chain—Block, Bicycle, Auto, Engine, Agricultural, Etc.)
Morse Chain Co.

Chairs and Stools.
Lyon Metallic Mfg. Co.
Manufacturing Equipment & Engineering Co.
Monarch Theatre Supply ICo.

Chemicals.
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Chlorine Gas.
Electro Bleaching Gas Co.

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Clements Mfg. Co.

Clocks—Hank, Etc.
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Clocks—Watchman.
Chicago Watchman Clock Co.

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Cloth Cutters.
Firsching, J. A.
Wildman Mfg. Co.

Cloth Guider (Electric).
Blake Electric Mfg. Co.

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Galladet Aircraft Corp.

Cloth Room Machinery.
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Scott & Co., Henry L.

Cloth Cones & Tubes.
Southern Novelty Co.

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Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Link-Belt Company.
Wood's Sons Co., T. B.

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Diamond State Fibre Co.

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Truitt Coal & Iron Co.
U. S. Fuel Corp.

Coal & Ash Handling Machinery.
Link-Belt Company.

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Allis-Chalmers Mfg. Co.
General Electric Co.
Walraven Co., The.

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Birmingham Slag Co.

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Allis-Chalmers Mfg. Co.

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Southern Novelty Co.

Cores (Winding.)
Southern Novelty Co.

Cone Winding Machines.
Foster Machine Co.

Connectors—Frankel Solderless.
Westinghouse Elec. & Mfg. Co.

Consulting Engineers.
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Contractors and Engineers—Building.
Goode, R. L.
Robbins & Sons, J. E.
Sirrine & Co., J. E.
Spiker & Lose.
Tufts Co., Arthur.

Contractors—Electrical.
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American Roofing & Paint Co.
Marshall Co., H. Newton.

Contractors (Piping.)
Marshall Co., H. Newton.

Contractors (Roofing.)
American Roofing & Paint Co.
Marshall Co., H. Newton.

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General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

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American Supply Co.
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Manufacturers Machine Co.

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Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Cotton Yarn and Cloth Commission Merchants and Dealers.
Atkinson Haserick & Co.
Bliss, Fabyan & Co.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Lane & Co., J. H.
Turner, J. Spencer
Weimar Bros.
Wellington Sears & Co.
Woodward Baldwin & Co.

Cotton Merchants and Brokers.
Beer, H. & B.

Cotton Mills.
Gray Mfg. Co.

Cotton Mill Machinery and Supplies.
Atkinson Haserick & Co.
Augusta Mill Supply Co.
Barber-Colman Co.
Blake Electric Mfg. Co.
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Cocker Mach. & Foundry Co.
Crompton & Knowles Loom Wks.
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Firsching, J. A.
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Foster Machine Co.
Galladet Aircraft Corp.
Greist Mfg. Co.
Howard Bros. Mfg. Co.
Hopedale Mfg. Co.
Howard & Bullough.
Manufacturers Machine Co.
Mossberg Pressed Steel Corp.
Phila. Drying Mchry. Co.
Proctor & Schwartz, Inc.
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Schaum & Uhlinger.
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Shambow Shuttle Co.
Slaughter Mchry. Co., G. G.
Smith & Furbush Mach. Co.
Southern Bending Co.
Southern Novelty Co.
Stafford & Co.
Steel Heddle Mfg. Co.
Terrell Machine Co.
Textile Fininshing Machinery Co.
Textile Specialty Co.
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Universal Winding Co.
Vermont Spool & Bobbin Co.
Walraven Co.
Warp Compressing Mch. Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co

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Cotton Tape Loom.
Fletcher Works.
Schaum & Uhlinger.

Cotton Yarn Mills.
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Counters—Revolution, Hank, Pick, Etc.
Boston Machine Works.
Slaughter G. G.

Counters (Time).
Service Recorder Co.

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Coupling—Shaft.
Cresson-Morris Co.
Wood's Sons Co., T. B.

Covers—Rollers.
Diamond State Fibre Co.

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Lowell Crayon Co.

Crushing Machinery.
Allis-Chalmers Mfg. Co.

Cutters—Cloth.
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Cypress Lumber.
Southern Cypress Mfg. Asso.

Cutters—Thread.
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Dehumidifying.
Sturtevant Co., B. F.

Delivery Cases.
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Desks (Factory).
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.

Dial Scales.
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Dies—Steel.
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Directory (Textile Mill).
Davison's Textile Blue Book.

Discs—Fibre.
Diamond State Fibre Co.

Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

Docks and Warehouses.
American Dock & Pouch Terminals.

Doffing Boxes—Mill.
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Doffing Cars.
(See Cars).

Door Closers and Checks.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Doors & Elevator Enclosures.
Dowman, George.

Door Hangers.
Dowman, George.
Richards-Wilcox Mfg. Co.

Doors—Steel.
Lupton's Sons Co., David

Draft Gauges.
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Drawing Frames.
Atkinson Haserick & Co.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Drills—Electric.
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Drinking Fountains.
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Drop Wires.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.

Drying Apparatus.
Bayley Mfg. Co.
Sturtevant Co., B. F.

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Pearson, Jos. T.

Drying Machinery.
American Laundry Mchry. Co.
Atkinson Haserick & Co.
Butterworth, H. W., & Sons Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

Dust Collectors.
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Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Yarn & Processing Co
Franklin Process Co.
United Piece Dye Works.

Dyeing, Bleaching, Finishing and Printing Machinery.
American Laundry Mchry. Co.
Atkinson Haserick & Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Galladet Aircraft Corp.
Klauder-Weldon Dyeing Mch. Co.
Manufacturers Machine Co.
Permutit Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
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Dyeing Machines (Package and Spool.)
Franklin Process Co.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Du Pont de Nemours & So., E. I.
Electro Bleaching Gas Co.
Ford Co., J. B.
Grasselli Chemical Co.
India Alkali Works.
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Mathieson Alkali Works, Inc.
National Aniline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Sonneborn Sons Co., Inc., L.
Southern Distributing Co.
Staley Mfg. Co., A. E.
Surpass Chemical Co.
United Chemical Products Corp.
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Elastic Stockings.
Estes Surgical Supply Co.
Perryman-Burson Co.

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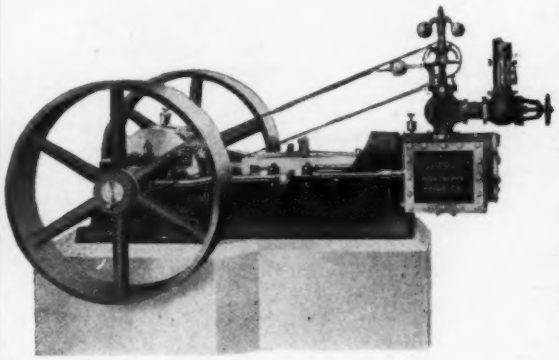

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Allis-Chalmers Mfg. Co.
Walraven Co., The.

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Fibre Products.
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Howard Bros. Mfg. Co.

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Permutit Co.
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Norwood Engineering Co.
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Fire Doors and Hardware.
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Perryman-Burson Co.

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Cresson-Morris Co.

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American Scrubbing Equip. Co

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See Brushes.

Fluted Rolls.
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Schofield & Sons, J. S.
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Southern Spindle & Flyer Co.
Whitin Machine Works.

Flyers.
Atkinson Haserick & Co.
Howard & Bullough.
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Southern Spindle & Flyer Co.
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Cresson-Morris Co.
Lombard Fdry. & Mch. Works.

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Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.
Twentieth Century Brass Works.

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(See Clutches—Friction).

Fuel.
(See Coal).

Fuel Economizers.
Sturtevant Co., B. F.

Fuses.
(See Elec. Mchy. and Supplies).

Garage Doors and Door Hardware.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.

Gas Engines.
(See Engines—Gas).

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Diamond State Fibre Co.

Gauge Cocks.
Lunkenheimer Co.

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Taylor Instrument Co.

Gauges—Mercury Column Vacuum.
Taylor Instrument Co.

Gauge—Oil.
Lunkenheimer Co.

Gauges—Pressure.
Taylor Instrument Co.

Gauges—Recording.
Taylor Instrument Co.

Gauges—Water.
Lunkenheimer Co.

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Morse Chain Co.

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Sturtevant Co., B. F.

Gear Cutting and Cutters.
Cresson-Morris Co.
Whitin Machine Co., D. E.

Gear Pullers.
General Electric Co.

Generators—Electric.
(See Motors and Generators).

Glassware and Dishes.
(See Dishes).

Governors—Pump.
General Electric Co.

Grates—Boiler.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

Grates—Mechanical.
(See Stokers).

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(See Lubricants).

Grease Cups.
(See Lubricators).

Grindstones.
Richards-Wilcox Mfg. Co.

Grinders—Card, Cylinder, Roll, Napper and Garnet.
(See Card Grinding Machinery).

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Bryan Electric Co.
Flexible Steel Lacing Co.

Guides—Thread.
Palmer Co., I. E.

Guider (Cloth-Electric.)
Blake Electric Mfg. Co.

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(See Finishing and Sizing Materials).

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Hill Standard Co.

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(See Shafting and Hangers).

Hardware (Building.)
Richards-Wilcox Mfg. Co.
Seawell, Luke.
Sanymetal Products Co.
Vonnegut Hardware Co.

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American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Southern Bending Co.

Heads—Bobbin and Spool.
Diamond State Fibre Co.

Heating and Ventilating Apparatus.
(See Ventilating Apparatus).

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Crompton & Knowles Loom Wks.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.

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Link-Belt Company.
Morse Chain Co.
Walraven Co.

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Collins, J. D.
Walraven Co.

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Cocker Mach. & Fdry. Co.
Franklin Process Co.

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(See Drying Forms).

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(See Yarn Manufacturers).

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Estes Surgical Supply Co.
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Hotel Tuller.
Hotel Martinique.

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Bayley Mfg. Co.
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Manufacturers Machine Co.
Parks-Cramer Co.
Sturtevant Co., B. F.

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Powers Regulator Co.
Taylor Instrument Co.

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(See Extractors).

Hydrometers.
Taylor Instrument Co.

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Taylor Instrument Co.

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Taylor Instrument Co.

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Powers Regulator Co.
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Sherman Service, Inc.

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Cumiskey Co., Edw. F.

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Estes Surgical Supply Co.
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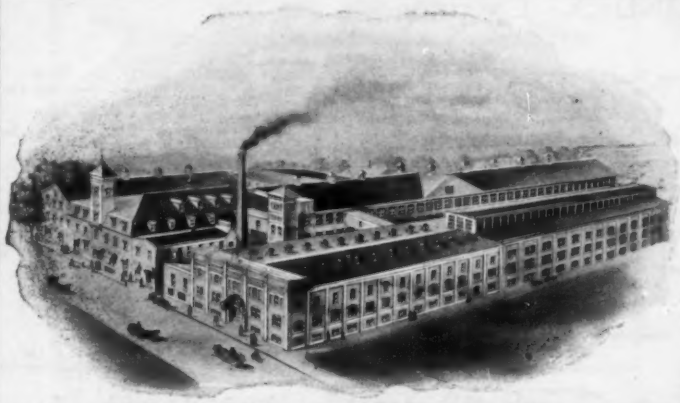
(See Belt Lacing).



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Cutter Works, George.
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(See Yarns—Linen).

Link Belting.
(See Belting—Link).

Linters.
(See Waste Dealers).

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(See Chlorine).

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Link-Belt Company.

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Richards-Wilcox Mfg. Co.

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Lyon Metallic Mfg. Co.
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Fletcher Works.
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Schaum & Uhlinger.
Stafford Co.

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Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

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(See Restaurant).

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(See Tools).

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Cresson-Morris Co.

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Marken Machine Co.

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Lupton's Sons Co., David.

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Westinghouse Elec. & Mfg. Co.

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Taylor Instrument Co.

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(See Architects and Engineers).

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(See Villages).

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(See Paint).

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(See Finishing and Sizing Materials).

Oils—Lubricating.
(See Lubricants).

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Atkinson Haserick & Co.
Lidseen

Oil Cups.
(See Lubricators).

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Bradley Mfg. Co., A. J.

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Phila. Drying Machinery Co.

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Richards Printing Co., J. B.
Showalter Printing Co., A. J.

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Taylor Instrument Co.

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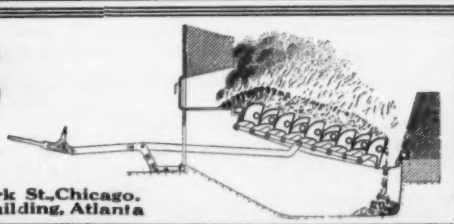

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Textile Finishing Machinery Co.

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Twentieth Century Brass Mfg. Co.
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Walraven Co.

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Merrow Machine Co., The.
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Cortright Metal Roofing Co.
Dowman, George

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Hightower Box & Tank Co.
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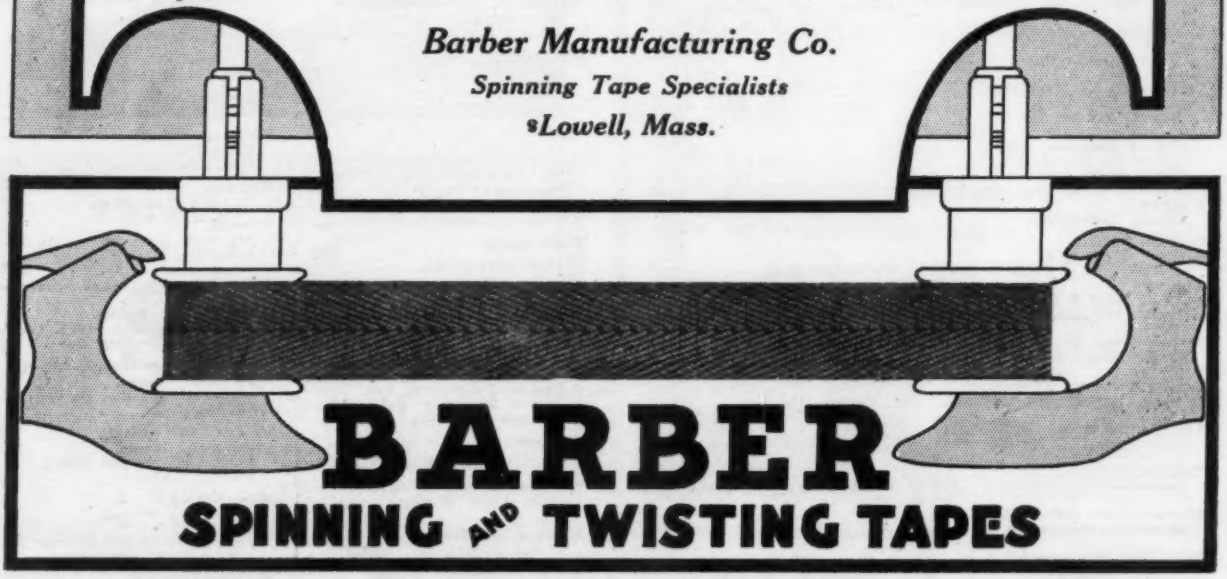

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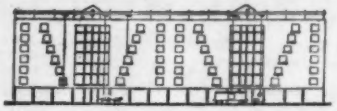

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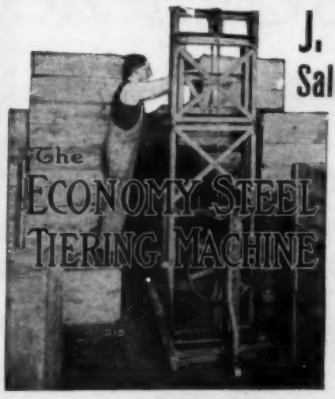

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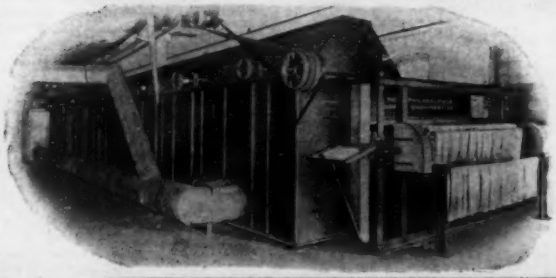

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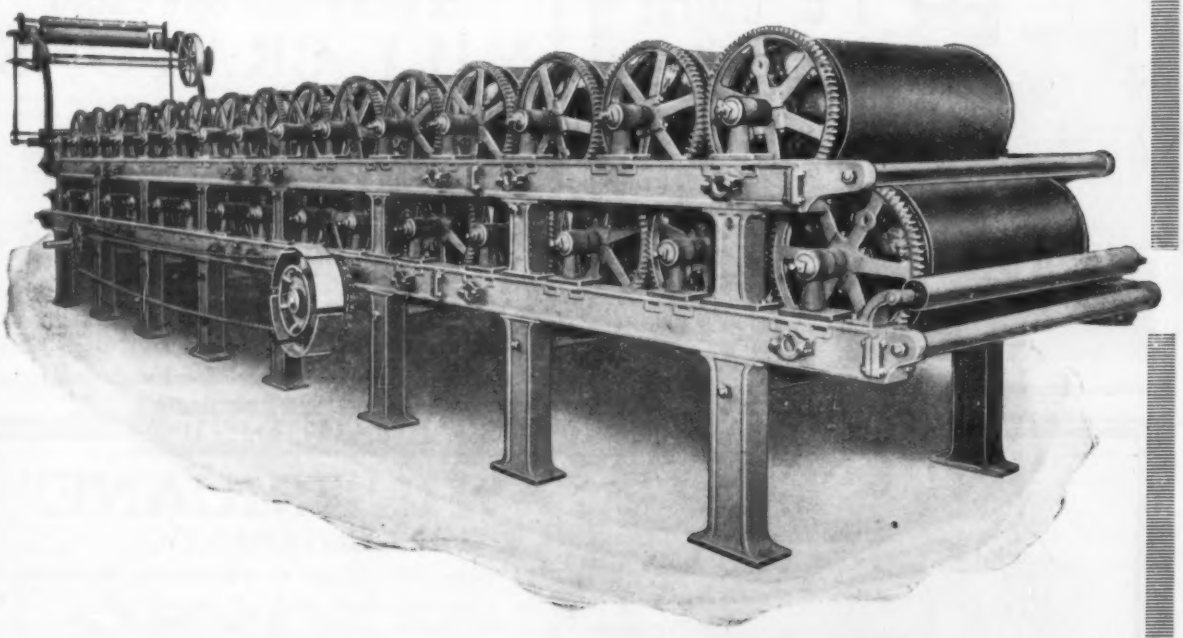

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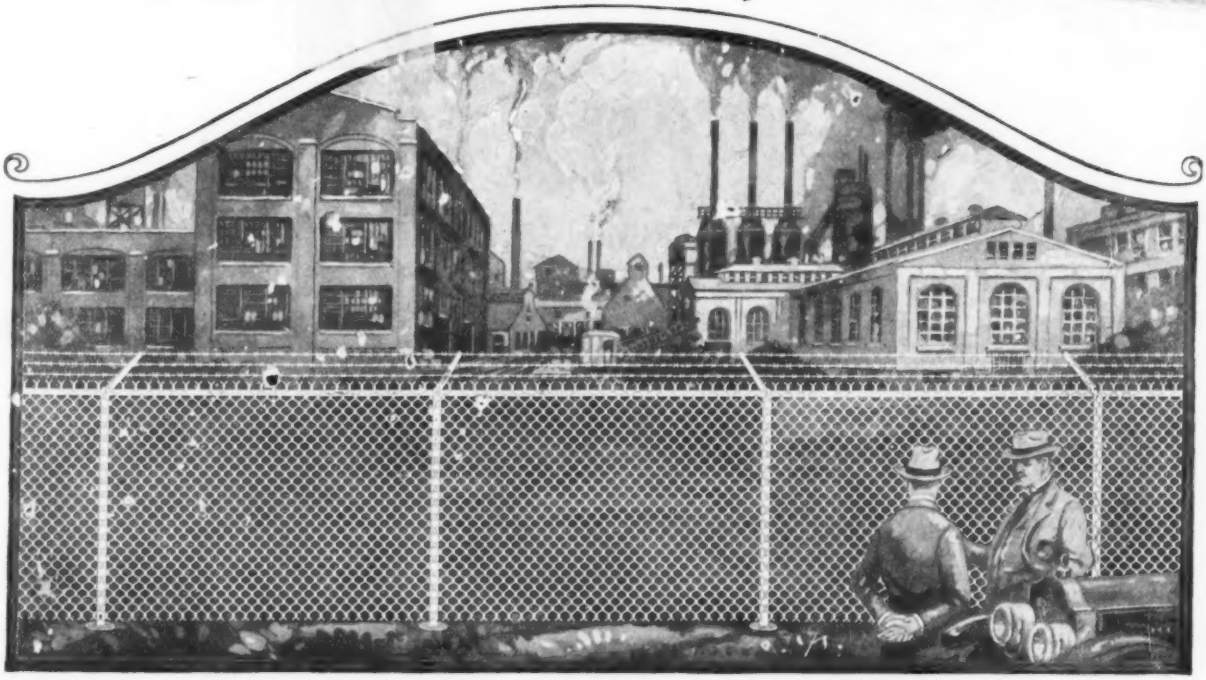

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